

زیندەوەرزانی

بۆ پۆلی پێنجەمی زانستی

ژمارەی سپاردن (٣٧٤) ساڵی ٢٠٠٢

تیراژ (١٠٠٠) دانە

٢٠٠٢ ز   ٢٧٠٢ کوردی   أ٦٧٥٢

چاپخانەی وەزارەتی پەروەردە - هەولێر

ܦܠܟܐ ܕܟܘܪܕܣܬܢ - ܥܝܪܩ
ܘܙܝܪܘܬ ܬܪܒܝܬܐ

هەریمی کوردستانی عیراق
وەزارەتی پەروەردە

ܡܠܦܢ̈ܐ

ܫܪ̈ܐ ܡܢܝܢܐ ܡܠܦܢܐ

ܡܬܪܓܡܢܐ : ܕ. ܕܢܝܐܠ ܫܡܢ ܢܝܢܝ
ܡܫܘܚܬܐ : ܐܒܪܗܡ ܫܡܢ ܝܘܚܢܢ

چاپی یەکەم ٢٧٠٢ کوردی - ٢٠٠٣ زایینی - ٦٧٥٢ ئاشوری

چاپخانەی وەزارەتی پەروەردە - هەولێر

سەرپەرشتی چاپ

نادر موشی مراد - اندریوس یوخنا

ܦܢܩܝܬܐ ܩܕܡܝܬܐ
(ܬܪܣܝܬܐ ܘܦܫܪܬܐ)

١. ܡܫܟܚܢܘܬܐ ܓܘܢܝܬܐ ܒܓܘ ܬܪܣܝܬܐ :

ܡܢ ܐܝܬܝܐ ܚܝܐ ܠܗܘܢ ܐܝܟ ܕܦܬܝܚܐ ܡܢܐ ܒܪܒܐ ܕܡܬܝܕܥܝܢ . ܕܟܠ ܡܢܗ ܗܘܡܐ ܐܢܫܐ ܠܡܫܟܚܘ ܒܫܘܠܛܢܐ ܣܘܓܐܐ ܡܫܠܡܬܐ ܡܢ ܡܢܝܢܐ ܘܡܫܚܠܦ ܚܝܐ ܘܙܘܥܐ ܘܪܒܝܬܐ ܘܡܬܪܒܝܢ . ܘܦܝܫܐ ܠܗ ܡܫܘܕܥܬܐ ܡܢܐ ܕܐܝܬ ܚܝܐ ܟܠ ܐܢܐ ܪܘܚܐ ܒܬܪܣܝܬܐ . ܘܦܝܫܐ ܡܢܐ ܦܠܓܐ ܐܝܬܝܐ ܚܝܐ ܠܦܘܬ ܐܘܪܚܐ ܕܬܪܣܝܬܗܘܢ ܠܬܪܝܢ ܓܘܢܐ :

ܩܕܡܝܐ . ܝܬܝܗ ܬܪܣܝܬܐ Autotrophic :

ܘܐܝܠܝܢ ܐܝܬܝܐ ܚܝܐ ܐܝܟ ܕܡܨܝܢ ܕܡܬܬܪܝܢ ܠܬܘܪܣܝܗܘܢ ܩܕܡܝܐ ܒܓܘܗ ܡܢ ܡܠܘܐܐ ܡܢܡܝܐ ܠܐ ܩܕܡܝܐ ܦܫܝܛܐ . ܐܝܟ ܬܪܡܘܬ ܐܘܟܣܝܕ ܟܪܒܘܢ ܡܢ ܐܐܪ . ܘܡܝܐ ܡܢ ܐܪܥܐ . ܒܦܘܠܚܢܐ ܕܒܘܗܪܐ ܫܡܫܐ . ܠܡܨܪܐ ܒܡܨܥܝܘܬܐ ܕܡܠܘܐܐ ܝܪܘܩܐ (ܟܠܘܪܘܦܝܠ) ܘܒܬܪܟܐ ܐܚܪܢܐ . ܕܡܨܝܢܐ ܡܢܐ ܠܬܫܠܡܬܐ ܕܡܠܘܐܐ ܡܢܡܝܐ ܠܐ ܩܕܡܝܐ . ܠܡܠܘܐܐ ܩܕܡܝܐ ܡܫܟܪܐ . ܕܠܗܘܢ ܢܦܫܬܐ ܐܝܟ ܕܡܫܘܚܠܦܝܢ ܡܢܐ ܐܐܪ . ܗܘ ܕܦܝܫ ܒܝܢܐ ܡܢܗ ܡܢܬܘܢܬܐ ܩܕܡܝܬܐ ܒܝ ܡܫܟܪܬܐ . ܐܝܟ ܦܪܘܛܝܢܐ ܘܡܝܟܠܐ . ܘܡܢ ܓܘܦܐ ܕܐܝܬ ܐܝܬܝܐ ܢܨܒܬܐ ܝܪܘܩܬܐ . ܘܒܝܬܪܐ ܕܒܢܝܐ ܒܗܪܐ . ܘܒܢܝܐ ܒܡܚܝܢܐ .

ܬܪܝܢܐ . ܠܐ ܝܬܝܗ (ܫܡܟܐ) ܬܪܣܝܬܐ Heterotrophic :

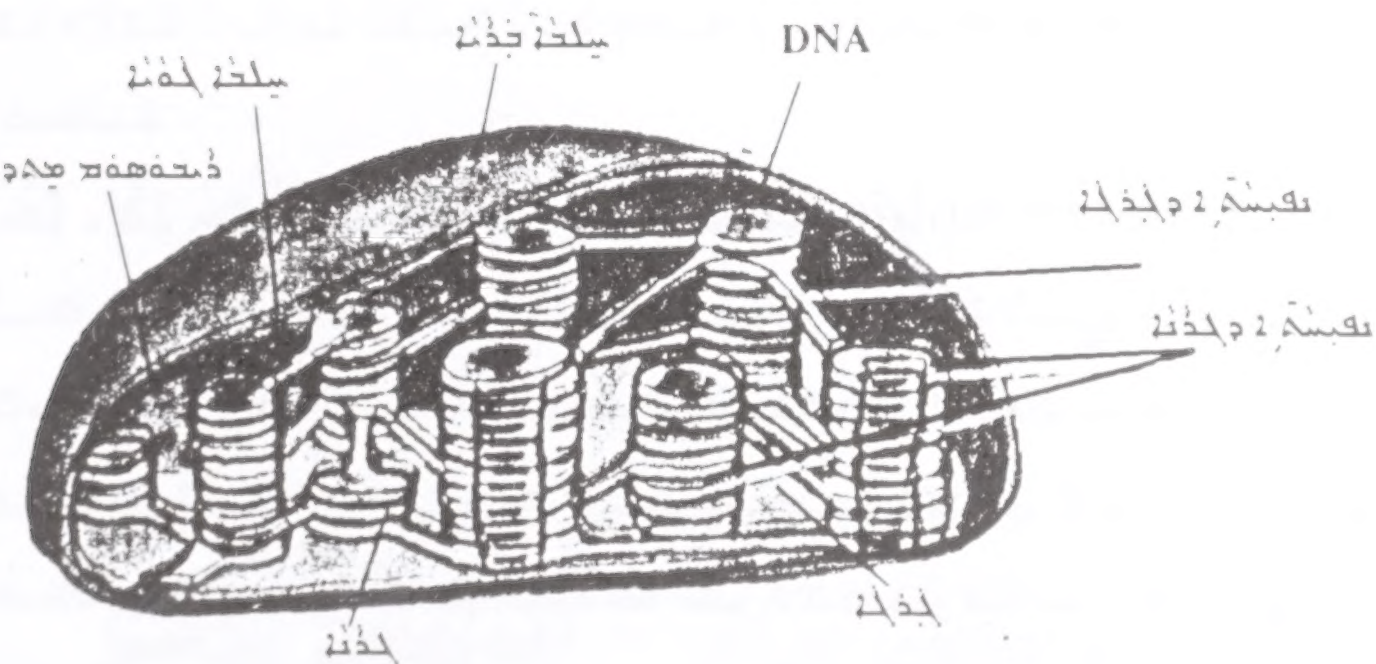
ܘܐܝܠܝܢ ܐܝܬܝܐ ܐܝܟ ܕܫܘܡܝܢ ܠܡܠܘܐܐ ܩܕܡܝܐ ܐܝܟ ܒܪܒܘܗܝܕܪܬܐ ܘܦܪܘܛܝܢܐ ܘܡܝܟܠܐ . ܘܐܦ ܫܘܡܝܢ ܠܐܘܛܘܡܛܐ ܚܦܪܝܐ ܒܬܘܪܣܝܗܘܢ . ܘܦܪܝܫܐ ܡܢܐ ܐܝܬ ܐܝܬܝܐ ܕܐܝܢ ܠܐ ܡܨܝܢ ܕܫܘܡܝܢ ܠܬܘܪܣܝܗܘܢ ܒܒܢܝܬܐ ܕܬܘܪܣܝܗܘܢ ܩܕܡܝܐ ، ܐܠܐ ܒܗ ܡܢܝܠܗ ܡܢ ܡܫܘܚܠܦ ܢܪܒܐ . ܘܡܢ ܓܘܦܐ ܕܐܝܬ ܐܝܬܝܐ ܚܝܘܬܐ ، ܘܢܒܗܡܬܐ ܚܝܐ ܐܚܪܢܐ ܫܘܝܬܐ ܡܢ ܗܘܪܡܘܢܐ ، ܐܝܟ ܢܒܗܡܬܐ ܐܝܟܐ ܕܒܗܠܪܐ ܘܦܛܪܝܬܐ ܘܡܢܝܬܐ ܩܠܝܬܐ

ܡܫܘܚܬܢܝܬܐ ܐܝܟ ܡܘܬܪܢܐ . ܒܓܐ ܗܝܕ ܬܠܢܝܬܐ ܥܠ ܦܪܓܐ ܕܡܫܘܚܬܐ
ܡܟܢܝܬܐ ܐܝܟܘܬ ܡܠܘܐ ܘܟܢܘܬܐ .

٢ - ܡܪܟܒܬܐ ܠܗ ܡܟܢܝܬܐ ܝܪܘܩܢܝܬܐ

٢ - ١ — ܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ (chloroplasts) ܘܡܪܟܒܗ ܒܡܚܙܝܬܐ ܕܟܢܢܐ ܙܥܘܪܐ :

ܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ ܝܠܗܘܢ ܠܘܚܡܐ ܦܪܘܛܘܦܠܣܡܐ ܘܟܠܝܐ . ܘܝܠܗܘܢ ܡܬܚܙܝܢ ܠܡܚܙܝܬܐ ܕܟܢܢܐ ܙܥܘܪܐ . ܘܡܪܟܒܬܐ ܕܗܘ ܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ ܟܡܐ ܫܠܕܐ ܘܩܠܦܐ ܬܪܝܢ ܢܦܘܪܝܬܐ ܠܘܩܒܠܬܐ (ܐܘܟܝܬ ܬܟܡܝ ܒܦܪܫܬܐ ܕܡܠܘܐܐ ܒܡܝܢܐ ܡܬܪܣܢܐ) . ܘܫܟܝܚ ܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ ܒܓܘܗ ܪܘܒܐ ܫܠܕܐ ܘܩܠܦܐ . ܒܐܨܘܪܬܐ ܕܐܣܦܓܐ . ܐܘ ܩܦܝܠܬܐ ܡܣܘܕܪܐ ܚܕܐ ܥܠ ܐܚܪܬܐ . ܡܬܩܪܝܐ ܡܢ ܕܝܠܗ ܡܕܝܐ ܒܩܦܝܠܬܐ ܕܓܪܢܐ (Grana Lamellae) . ܘܡܬܚܒܫ ܒܝܢ ܓܪܢܐ ܩܦܝܠܬܐ ܫܠܕܢܝܬܐ ܦܫܝܛܐ ܡܢܐ ܡܕܝܐ ܒܩܦܝܠܬܐ ܕܒܝܢ ܓܪܢܐ (Intergran Lamellae) . ܐܘ ܒܠܚܘܕ ܦܫܝܛ ܡܬܩܘܡܐ ܩܦܝܠܬܐ ܕܓܪܓܐ (ܡܬܪܘܡܐ) (Stroma Lamellae) . ܘܐܝܬ ܒܝܢ ܩܦܝܠܬܐ ܫܠܕܢܝܬܐ ܘܡܪܓܝܗ . ܡܠܘܐܐ ܡܢܐ ܒܢܝܘܬܐ ܦܪܘܛܝܢܝܬܐ . ܦܫܛܐ ܝܠܗ ܡܕܝܐ ܓܪܓܐ (Stroma) . ܒܟܐ ܡܫܝܢ ܥܠ ܦܪܘܛܘܢܝܬܐ ܫܪܝܝܬܐ . ܘܝܠܗܘܢܝܬܐ ܘܡܬܝܬܐ ܘܡܫܘܚܬܐ ܐܘܟܝܬ . ܒܟܐ ܡܚܘܝܢ ܨܘܪܬܐ (١ — ١) ܡܢܐ ܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ . ܐܝܟ ܕܡܚܘܝܐ ܝܠܗ ܗܘܝܐ ܡܪܟܒܬܐ ܐܠܩܛܪܘܢܐ .



ܨܘܪܬܐ (١ — ١) ܡܚܘܝܢܐ ܡܪܟܒܬܐ ܠܪܘܟܒܐ ܕܦܠܣܛܝܕܐ ܝܪܘܩܢܝܬܐ

ܐܝܟ ܟܠܘܪܘܦܝܠ ܘܨܘܒܥܐ ܐܚܪܢܝܐ ܥܠ ܓܘܫܡܐ ܚܠܛܢܝܬܐ
ܠܦܠܚܝܬܐ ܢܘܗܪܝܬܐ . ܘܐܝܟ ܠܡܦܪܥܘܬܐ ܕܫܘܬܦܘܬܐ ܕܟܪ̈ܝܬܐ ܕܚܝܘܬܐ
ܕܚܠܝܡܘܬܐ ܟܪ̈ܝܬܐ ܓܘ ܦܠܚܝܬܐ ܢܘܗܪܝܬܐ .

٢ — ١ — ١ - ܡܘܪܟܒ̈ܐ (ܟܠܘܪܘܦܝܠ) :

ܡܫܘܚܬܢܐ ܐܝܬܘ ܡܘܪܟܒ̈ܐ ܡܢ ܪܘܟܒܐ ܫܘܬܦܢܝܐ ܐܢܫܝܐ . ܟܕ ܗܘ ܐܝܟ ܓܘ ܟܠܗܝ ܐܝܟ ܡܢܝܢܐ ܠܟܪ̈ܝܬܐ ܟܘܪ̈ܝܐ . ܘܟܐ ܡܫܚܐ ܠܗܘܢ ܓܘܢܐ ܢܘܗܪܐ ܘܟܠܝܐ ܠܐ ܡܟܝܢ ܐܗܐ ܓܘܢܐ ܡܛܠ ܐܝܬܘܬܐ ܕܨܘܒܥܐ ܐܚܪܢܝܐ ܓܘ ܟܢܫܐ ، ܡܟܫܦ ܓܘܢܗ ܐܠܗ .

ܘܦܬܠܘܗܝ ܢܝܢܐ ܐܪܒܥܐ ܪܒܐ ܡܢ ܡܘܪܟܒ̈ܐ . ܘܟܠܗ ܫܒܝܥܐ ܡܢܐ ܫܪܐ ܡܢܐ ܐܫܡܐ ، ܦܬܚܐ ܐܝܬ ܡܫܘܡܗܐ ܦܘܪܦܝܪܝܢ (Porphyrin) ܕܫܒܝܥܐ ܐܝܬ ܫܪܐ ܝܚܐ ܕܡܓܢܝܣܝܘܡ ܒܡܨܥܬܗ . ܘܦܪܝܫܐ ܡܢܐ ܐܪܒܥܐ ܕܡܘܪܟܒ̈ܐ ܡܢ ܫܪܟܐ ܓܘ ܒܘܢܝܐ ܡܫܚܠܦܐ ، ܐܫܝܪܐ ܒܦܪܫܘܬܐ ܕܟܪ̈ܒܘܢ ، ܡܡܘܪܐ ܠܫܠܡܬܐ ܕܦܘܪܦܝܪܝܢ ܡܬܚܪܘܢܝܬܐ ، ܟܕ ܗܘܐ ܒܘܢܝܐ ܡܫܚܠܦܐ ܒܡܘܪܟܒ̈ܐ (ܐ) CH 3 ، ܘܒܡܘܪܟܒ̈ܐ (ܒ) CHO .

ܘܠܗܘܢ ܐܝܬ ܦܘܪܫܢܐ . ܦܬܠܘܗܝ ܫܒܝܥܐ ܐܪܒܥܐ ܕܡܘܪܟܒ̈ܐ ، ܘܡܢܗܘܢ ܐ ، ܒ ، ܓ ، ܕ ، ܐܝܟ ܒܡܫܪܬܐ ܕܟܪ̈ܝܬܐ ܟܘܪ̈ܝܐ ، ܫܒܥܐ ܟܠ ܡܘܪܟܒ̈ܐ ܕܝܠܗܘܢ ، ܡܫܘܡܗܐ ܡܘܪܟܒ̈ܐ ܒܡܫܪܬܐ (ܐ) ، ܘܡܘܪܟܒ̈ܐ ܒܡܫܪܬܐ (ܒ) . ܘܟܪܝܟܐ .

ܘܡܫܘܚܬܢܐ ܐܝܬܘ ܡܘܪܟܒ̈ܐ (ܐ) ܗܘ ܐܪܒܥܐ ܒܝܬ ܐܢܫܝܐ ، ܡܛܠ ܐܝܬܘ ܡܘܪܟܒ̈ܐ ܫܪܫܝܐ ܓܘ ܦܠܚܝܬܐ ܕܟܪ̈ܝܬܐ ܟܘܪ̈ܝܐ ، ܐܝܟ ܐܪܒܥܐ ܐܚܪܢܐ ܕܡܘܪܟܒ̈ܐ ، ܐܝܬܘܢ ܨܘܒܥܐ ܡܫܠܡܢܝܐ ، ܟܕ ܠܡܫܪܐ ܠܡܘܥܐ ܟܘܪ̈ܝܐ ، ܘܡܫܘܕܥܐ ܠܡܘܪܟܒ̈ܐ (ܐ) .

٢ — ١ — ٢ - ܨܘܒܥܐ ܡܫܠܡܢܝܐ ܐܚܪܢܝܐ :

ܫܟܝܚ ܦܠܚܝܬܐ ܢܘܗܪܝܬܐ ܚܕܝܪ ܡܢ ܡܘܪܟܒ̈ܐ ܨܘܒܥܐ ܐܚܪܢܝܐ ܐܝܟ ܟܪܘܬܝܢܝܐ ($C_{40}H_{56}$) Carotenes ، ܘܙܢܬܘܦܝܠܝܐ ($C_{40}H_{56}O_2$) Xanthophylls ، ܘܐܝܬ ܨܘܒܥܐ ܕܫܡܠܝ ܓܘܢܐ ܡܢ ܐܝܟ ܗܘܡܡܐ ܘܐܪܓܘܢܐ ܘܣܘܡܩܐ ܘܫܘܬܦܢܐ ، ܘܐܝܬ ܙܘܥܪܐ ܡܫܚܠܦܐ ، ܠܐ ܙܕܩܝܢ ܓܘ ܡܝܐ ، ܐܠܐ ܙܕܩܝܢ ܓܘ ܡܫܪܝܢܐ ܗܝܕܢܐ ، ܐܝܟ

ܐܝܟܘ. ܘܣܘܓܐܐ ܡܢܗܘܢ . ܘܠܐ ܡܨܝܢ ܓܘܢܐ ܕܐܢܐ ܙܘܓܠܬܐ ܡܢ ܚܠܠܬܐ
ܕܡܬܚܫܚܬܐ ܕܓܘܢܐ ܢܗܘܪܐ ܕܢܘܗܪ̈ܐ ܟܠܗ . ܐܝܟܐ ܕܒܐ ܡܨܝܢ ܓܘܢܗ .
ܗܕܐ ܥܠܬܐ ܕܢܘܗܪ̈ܐ ܒܡܘܣܦܐ ܕܡܥܠܝܬܐ .

ܘܐܝܬ ܐܦ ܚܕ ܒܘܢܟܐ ܐܚܪܢܐ ܡܢ ܙܘܓܠܬܐ ܡܫܟܚܢܬܐ . ܦܝܟܐ ܗܢܐ
ܡܬܩܪܝܐ ܦܝܟܘܒܝܠܝܢܐ (Phycobilins) . ܘܒܠܚܘܕ ܕܘܒܪ̈ܐ
ܦܪܘܛܝܣܛܐ . ܕܐܝܟ ܓܘ ܡܢܐ . ܡܢܗܘܢ ܘܪܕܐ ܘܣܘܡܩܐ . ܘܦܠܚܝܢ ܒܠܚܘܕ
ܥܠ ܠܩܘܛܐ ܕܗܘܦܩܐ ܢܘܗܪܐ . ܘܡܫܠܡܝܢ ܠܟܠܘܪܘܦܠ̈ܐ (2) .

٢ ـ ٢ ـ ܒܢ̈ܝܢܐ ܢܘܗܪܝܐ Photosynthesis :

ܡܣܘܥܪܢܐ ܝܠܗ ܒܢܝܢܐ ܢܘܗܪܝܐ ܟܠܘܪܘܦܠܐ ܕܫܚܬܐ ܠܒܢ̈ܝܢܐ ܕܟܠܘܪܘܦܠܐ
ܒܢܝܢܐ ܢܘܗܪܝܐ . ܒܕ ܒܠܚܘܕ ܡܠܘܐܐ ܐܝܟ ܕܡܬܒܪܝ ܒܪ̈ܘܚܐ ܒܘܪܟܬܐ
ܠܓܘܫܡܐ ܢܒܝܬܝܐ ܘܚܝܘܬܢܝܐ . ܐܝܟ ܡܢ ܟܠܘܪܘܦܠܐ ܕܒܢܝܢܐ ܢܘܗܪܝܐ .
ܒܢܘܪܬܐ ܡܣܪܢܝܬܐ ܘܠܐ ܡܣܪܢܝܬܐ . ܘܐܦ ܗܘܦܩܐ ܗܘ ܕܡܬܒܪܝܠܗ ܐܝܬܝܐ
ܚܝܐ . ܦܝܟ ܥܡܠܐ ܐܟܝܬ ܡܢ ܐܗܐ ܡܬܘܟܐ . ܘܗܘܦܩܐ ܕܦܠܚܝ ܒܒܕܢܐ
ܕܐܬܩܕܬܐ ܕܟܠܘܪܘܦܠܐ . ܐܝܟ ܕܦܠܚܝ ܡܘܦܠܚܐ ܒܟܠܘܪܘܦܠܐ ܚܝܘܬܢܝܬܐ .
ܒܕ ܡܬܦܩܝܢ ܗܘܦܩܐ ܡܥܘܣܠܦܐ ܡܢ ܒܘܪܐ ܕܥܡܪ̈ܐ . ܗܘ ܕܦܠܚܝܐ ܗܘܐ
ܣܒܝܪܐ ܝܕܥܬܝܬ . ܠܗ ܡܢܬܝܬܐ ܕܘܒܪ̈ܐ ܗܘܡܝܐ . ܠܗ ܟܠܘܪܘܦܠܐ
ܕܒܢܝܢܐ ܢܘܗܪܐ . ܘܡܬܣܠܦܐ ܢܕܝܐ ܠܗܘܦܩܐ ܘܠܓܘܬܢܝܐ . ܝܠܗ ܒܘܪܟܬܐ
ܢܒܝܬܝܬܐ ܢܕܘܡܝܐ ܘܡܬܒܘܥ ܡܢ ܗܘܝܐ ܕܒܢ̈ܝܢܐ ܢܘܗܪܐ . ܗܘ ܟܠܘܪܘܦܠܐ
ܕܟܬܐ ܠܣܘܪܓܕܐ ܠܡܦܩܕܬܐ ܕܟܠܘܪܘܦܠܐ ܒܐܗܐ ܒܢܝܢܐ . ܗܘ ܝܠܗ ܡܬܘܟܐ
ܠܣܘܪܢܐ ܠܐܘܚܕܢܝܢ ܒܐܪܥܐ ܕܐܪܥܐ ܒܒܕܢܐ ܡܐܡܪܬܐ . ܘܐܘܚܕܢܝܢ ܗܘ
ܕܩܢܘܢ ܐܠܗ ܒܠܚܘܕ ܐܝܬܝܐ ܚܝܐ . ܦܠܚܝ ܡܢ ܠܗ ܟܠܘܪܘܦܠܐ ܕܒܢܝܢܐ ܢܘܗܪܐ

ܘܡܒܘܥ ܡܢ ܐܪܥܐ ܡܠܝܠܐ ܡܢ ܢܒܝܬܝܐ . ܟܠܘܪܘܦܠܐ ܕܒܢܝܢܐ ܢܘܗܪܐ .
ܢܦܩܐ ܡܢܝܬܐ ܐܡܝܢܘܬܐ ܕܐܝܬܘܬܐ ܕܒܠܚܘܕ ܐܝܬܝܐ ܚܝܐ . ܘܡܢܠ ܕܐܗܐ
ܣܘܥܪܢܐ ܝܠܗ ܟܠܘܪܘܦܠܐ ܕܒܢܝܢܐ ܢܘܗܪܐ . ܗܘ ܟܠܘܪܘܦܠܐ ܚܝܘܬܢܝܬܐ
ܒܕ ܐܢܫܘܬܐ ܒܠ ܒܠܚܘܕ .

٢ — ٢ — ١ ـ ܢܘܗܪܐ ܘܓܘܢܐ ܠܗ ܡܬܚܙܝܢܘܬܐ ܕܥܝܢ̈ܐ ܢܘܗܪ̈ܢܐ :

ܗܘܪܟܐ ܐܝܬܠܗ ܗܘܡܦܐ ܠܓܠܘܠ̈ܐ ܡܢ ܚܕܝܘܬܐ ܡܫܒܢܝܬܐ ܡܟܘܡܟܘܡܐ ܦܘܬܘܢ̈ܝܬܐ (Photones) ، ܘܗܘܡܦܐ ܕܦܘܬܘܢ ܡܟܘܡܟܘܐ ܐܝܬܠܗ ܒܟܘܢܬܐ Quantum ، ܘܟܠܢܐ ܐܝܬܠܗ ܗܘܡܦܐ ܕܦܘܬܘܢ ܥܠ ܐܘܪܟܘܬܐ ܕܓܠܠܐ ܕܓܘܢ̈ܐ ، ܘܗܘܝ ܐܢܐ ܗܘܡܦܐ ܠܟܘܪܐ ، ܒܡܟܐ ܕܗܘܝܐ ܐܘܪܟܘܬܐ ܕܓܠܠܐ ܒܪܝܟܐ . ܘܡܘܢܐ ܕܗܘܡܦܐ ܠܓܠܘܠ̈ܐ ، ܗܘ ܕܡܡܠܝ ܡܢܗ ܐܝܬܝܐ ܡܘܬܪ̈ܢܐ ، ܕܡܩܝܡ ܒܡܬܚܙܝܢܘܬܐ ܕܥܝܢ̈ܐ ܢܘܗܪ̈ܢܐ ، ܐܝܬܠܗ ܢܘܗܪܐ ܡܬܚܙܝܢܢܐ "" Visible Light "" ، ܗܘ ܕܡܪܝܐ ܒܟܝܪ̈ܐ ܕܡܫܬܒܪܝܢ ܠܗ ܚܕ ܢܩܝܪܐ ܘܠܗܠܝܢܢ̈ܐ ، ܠܓܘܢ̈ܐ ܕܡܫܪܝ ܡܢ ܡܒܥܒܢܐ ، ܕܐܝܬܠܗ ܗܘ ܓܪܝܐ ، ܒܐܘܪܟܘܬܐ ܕܓܠܠܐ ، ܠܣܡܘܩܐ ܕܐܝܬܠܗ ܗܘ ܟܝܟ ܐܘܪܟܐ ، ܐܝܟ ܕܡܚܘܝܐ ܐܝܬܠܗ ܒܐܗܐ ܗܘܪܟܐ :

ܓܘܢܐ	ܐܘܪܟܘܬܐ ܕܓܠܠܐ ܒܐܢܓܣܬܪܘܡ (A)
ܡܒܥܒܢܐ	٤٣٠٠ ـ ٣٩٠٠
ܙܪܩܐ	٤٧٠٠ ـ ٤٣٠٠
ܙܪܩܐ ܡܝܪܩܐ	٥٠٠٠ ـ ٤٧٠٠
ܝܪܘܩܐ	٥٦٠٠ ـ ٥٠٠٠
ܟܘܡܬܢܐ	٥٩٠٠ ـ ٥٦٠٠
ܬܦܘܚܢܐ	٦٢٠٠ ـ ٥٩٠٠
ܣܡܘܩܐ	٧٦٠٠ ـ ٦٢٠٠

ܗܘܪܟܐ ܡܚܘܝܐ ܠܓܘܢ̈ܐ ܕܢܘܗܪܐ ܡܬܚܙܝܢܢܐ ܘܐܘܪܟܘܬܐ ܓܠܠܐ ܠܓܘܢ̈ܐ ܡܬܟܝܠܝܢ ܒܟܝܠܬܐ ܒܐܘܪܟܘܬܐ ܕܐܢܓܣܬܪܘܡ (A) ܘܗܘܝܐ 10^{-7} ܡܠܡ .

٢ ـ ٢ — ٢ ـ ܦܠܚܘܬܐ ܕܥܝܢ̈ܐ ܢܘܗܪ̈ܢܐ :

ܟܪܝ ܐܝܬ ܦܠܚܘܬܐ ܠܗ ܦܠܣܬܝܬܐ ܢܘܗܪܢܝܬܐ ، ܘܡܫܟܚܝܢ ܗܟܝ ܐܡܪܝܢܢ ܡܢ ܦܠܚܘܬܐ :

(١) ܦܥܠܢܘܝܬܐ ܢܘܗܪܢܝܬܐ light Reactions :

ܘܐܝܠܗܝ ܦܥܠܢܘܝܬܐ ܕܟܐܪ̈ܝܢ ܒܐܝܕܘܬܐ ܕܢܘܗܪܐ . ܘܗ̄ܘܝܢ ܡܠܘܠܝܬܐ ܐܪ̈ܒܐ . ܘܟܕܒܝ ܓܘ ܣܝܠܩܐ ܕܟܠܪܐ ܠܦܠܛܡܝܪ̈ܬܐ ܢܕܘܡܝܬܐ ܐܡܬܐ ܕܐܝܬ ܡܘܕܡܢܐ . ܘܓܘ ܐܢܐ ܦܥܠܢܘܝܬܐ ܟܕܢܐ ܡܫܚܠܦܬܐ ܕܐܘܡܦܐ ܢܘܗܪܢܐ ܠܐܘܡܦܐ ܟܝܡܝܝܐ ܐܝܟ ܕܟܐܬܐ ܠܬܚܬ :

ܠܡܝܢ ܡܢܐܘܝܬܐ ܕܡܘܕܡܢܐ ܠܐܘܡܦܐ ܢܘܗܪܐ ، ܘܡܢ ܦܠܛܐ ܕܗܘܝ ، ܠܟܒܝܢ ܐܢܐ ܡܢܐܘܝܬܐ ، ܘܦܠܛ ܡܢܝܗ ܐܠܩܛܪܘܢ (e) ܡܘܚܒܢܐ ܒܐܘܡܦܐ . ܟܕ ܗܘܝ ܡܢܐ ܐܗܐ ܐܠܩܛܪܘܢ ܓܘ ܚܕܐ ܪܫܡܬܐ ܡܢ ܐܘܪܚܐ ܗܕܡܝܐ ، ܒܕܝܟܐ ܒܫܘܪܐ ، ܘܒܟܕܢܐ ܕܡܢܝܢܝܗ ܡܫܠܡ ܠܐܘܡܦܐ ܗܘ ܕܐܬܐ ܡܢ ܠܡܝܢܗ ܡܢ ܢܘܗܪܐ . ܘܐܗܐ ܐܘܡܦܐ ܦܠܛܐ ܦܝܫ ܡܘܦܠܚܐ ܓܘ ܒܢܝܐ ܕܐܘܪܚܐ ܗܕܡܝܐ ܡܟܘܡܟܗܐ (ܐܕܢܘܣܝܢ ܛܪܝ ܦܘܣܦܐܬ Tri Adenosine Phosphate) ܘܒܩܘܨܪܗ (ATP) . ܘܗܕܡܐ ܡܟܘܫܚܠܦܠܗ ܐܘܡܦܐ ܢܘܗܪܢܐ ܠܐܘܡܦܐ ܟܝܡܝܝܐ ، ܡܛܘܦܣܐ ܒܐܘܪܚܐ ܟܝܡܝܝܐ (ATP) ܗܘ ܕܦܝܫ ܡܘܦܠܚܐ ܓܘ ܦܥܠܢܘܝܬܐ ܠܐ ܢܘܗܪܢܝܬܐ ܢܡܘܦܝܬܐ . ܐܦ ܫܟܝܢ ܦܥܠܢܘܝܬܐ ܢܘܗܪܢܝܬܐ ܒܐܝܕܘܬܐ ܕܡܝܐ ܢܘܗܪܢܝܐ (Photolysis) ܠܟܠ ܡܢ ܐܘܟܣܓܝܢ (O_2) ، ܗܘ ܕܦܠܛ ܒܐܣܟܡܐ ܕܗܘܦܐ ܐܝܟ ܓܦܪܝܬܐ ܒܪܝܬܝܐ ، ܘܗܝܕܪܘܓܝܢ (H) ، ܘܐܚܪܢܐ ܡܒܪܐ ܡܘܪܦܝܐ ܕܐܘܪܚܐ ܗܕܡܝܐ ܡܟܘܡܟܗܐ .

Nicotineamide Adenine Dinucleotide - Phosphate ܘܒܩܘܨܪܗ (NADP) * ܒܕ ܡܫܚܠܦܘܗ ܠ NADPH ، ܘܐܚܪܢܐ ܝܠܗ ܚܕ ܐܘܪܚܐ ܗܕܡܝܐ ܡܡܘܪܦܝܐ ܘܚܝܠܢܐ ، ܦܝܫ ܡܘܦܠܚܐ ܟܕ ܗܘܝ ܓܘ ܦܥܠܢܘܝܬܐ ܠܐ ܢܘܗܪܢܝܬܐ .

ܒܢܦܝܩܐ ܡܢ ܗܕܐ ܪܟܒܐ ܕܦܥܠܢܘܝܬܐ ܢܘܗܪܢܝܬܐ ، ܡܬܚܠܒܝ ܒܫܕܬܐ ܠܐܘܪܓܐ ܕܟܠ ܡܢ ATP ܘ NADPH ، ܘܦܝܫܐ ܡܢܐ ܝܕܝܥܐ ܐܢܐ ܐܪܒܝ ܐܘܪܚܐ ܟܡ ܚܕܢܐ (ܒܚܝܠܐ ܡܥܪܦܝܬܐ) ، ܘܗܘ ܐܢܫܡܬܐ ܝܠܗ ܠܦܥܠܢܘܝܬܐ ܠܐ ܢܘܗܪܢܝܬܐ ܢܡܘܦܝܬܐ .

---

* NADP ܝܠܗ ܐܢܙܝܡܐ ܡܫܚܠܦܢܐ ، ܡܫܘܬܦ ܓܘ ܦܥܠܢܘܝܬܐ ܕܡܫܢܝܬܐ ܕܗܝܕܪܘܓܝܢ (ܐܠܩܛܪܘܢ) ܓܘ ܦܥܠܢܘܝܬܐ ܕܒܢܝܐ ܢܘܗܪܐ ܘܫܘܫܐ .

(٢) ܦܥܠܝܘܬܐ ܠܐ ܢܘܗܪܢܝܬܐ

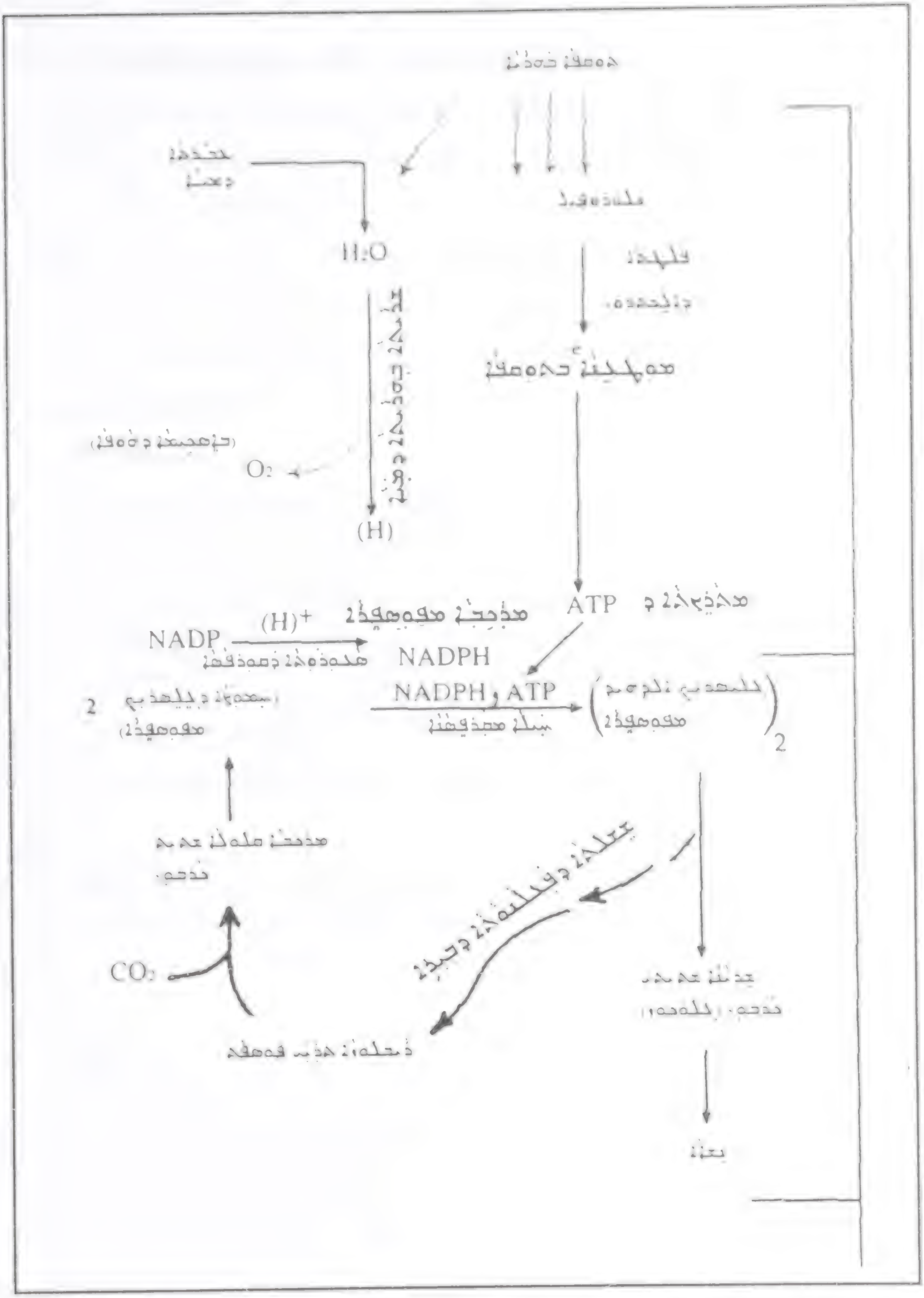
(ܦܥܠܝܘܬܐ ܕܚܫܘܟܐ) Dark Reactions :

ܩܪܝܢ ܟܕ ܐܢܝ ܦܥܠܝܘܬܐ ܠܐ ܣܢܝܩܢ (ܠܢܘܗܪܐ) ܠܡܫܬܡܠܝܘܬܐ ܕܗܘܝܬܗܝܢ . ܘܐܢܝ ܦܥܠܝܘܬܐ ܕܠܐ ܣܢܩܝܢ ܠܢܘܗܪܐ ܡܬܩܪܝܢ ، ܐܠܐ ܣܢܩܝܢ ܠܟܠ ܦܠܛܐ ܕܦܥܠܝܘܬܐ ܢܘܗܪܢܝܬܐ (ATP ܘ NADPH) ، ܠܗ ܐܢܝ ܦܥܠܝܘܬܐ ، ܐܝܟ ܡܘܬܪܨܐ ܚܕܝܢ ܘܡܫܘܚܬܐ ܕܟܪܒܘܢ (CO_2) ، ܒܥܘܕܪܐ ܕܣܟܐ ܒܥܠܬܐ ܕܒܝܬܐ ܡܢ ܦܥܠܝܘܬܐ ، ܒ ܒܡܘܪܟܐ ܕܟܠܘܢ (Calvin's Cycle) ܒܫܡܐ ܠܥܘܬܕܐ ܟܠܘܢ ، ܘܠܗ ܕܗܘܐ ܒܥܠܬܐ ܡܢ ܦܥܠܝܘܬܐ ، ܟܕ ܥܒܕܢܝܬܐ ، ܒܓܪܒܝܗ ܡܬܚܠܦܐ ، ܐܦ ܟܕ ܥܒܕ (ܠܚܝܠܐ) ܘܡܫܘܚܬܐ ܕܒܝܬܐ ܗܠܝܢ :

ܟܕ ܡܛܝܬܐ ܕ CO_2 ܠܡܬܕܥܪܢܐ ܕܦܠܚܡܝܬܐ ܢܒܘܥܬܐ ، ܡܫܝܢ ܥܡ ܫܒܝܩܐ ܡܬܘܡܬܐ ܕܥܒܘܠܘܬܐ ܚܕܝܢ ܦܘܣܦܬܐ ، ܒܡ ܡܬܕܥܪܢܐ ܚܡ ܕܘܒܒܐ ܡܠܘܠܐ ܥܡܫܝܢ ܝܬܝܪܐ ܕܟܪܒܘܢ ، ܒܡܘܕܥܢܐ ܚܕܐ ܠܚܕܝܢ ܡܬܦܘܪܫܬܐ ܡܢ ܕܘܒܒܐ ܚܠܝܡܝܢ ܝܬܝܪܐ ܕܟܪܒܘܢ ܡܬܘܡܬܐ (ܫܡܘܥܐ ܠܠܒܫܢܝܐ ܡܘܦܣܦܬܐ PGA) ، ܘܗܘܐ ܒܟܕܐ ܐܝܟ ܡܘܬܪܨܐ ܠܠܒܫܢܝܐ ܐܠܕܗܝܕ ܡܘܦܣܦܬܐ ، ܒܥܡܠܐ ܕܚܝܠܐ ܡܬܪܨܢܐ (ATP ، NADPH) ، ܦܠܛܐ ܡܢ ܦܥܠܝܘܬܐ ܢܘܗܪܢܝܬܐ ، ܟܕ ܗܘܐ ܠܟܡ ܡܬܕܥܪܢܐ ܠܠܒܫܢܝܐ ܐܠܕܗܝܕ ܡܘܦܣܦܬܐ ، ܒܣܟܐ ܒܥܠܬܐ ܡܢ ܦܥܠܝܘܬܐ ܕܒܝܬܝܬܐ ، ܫܘܡܝ ܒܗܝܢܐ ܕܡܬܕܥܪܢܐ ܕܥܒܕܐ ܫܒܝܩܐ (ܕܥܘܒܘܠܐ ܚܕܝܢ ܦܘܣܦܬܐ) ، ܕܐܝܟ ܡܛܝܒܐ ܠܡܩܒܠܬܐ ܕ CO_2 . ܘܠܗ ܒܥܠܬܐ ܕܐܢܝ ܦܥܠܝܘܬܐ ، ܟܕ ܐܢܫܐ ܡܢ ܥܒܕܐ ܕܝܒܫܐ (ܓܠܘܩܘܙ) ، ܘܥܒܕܐ ܕܐܚܪܢܐ (ܦܪܘܬܝܢ) ، ܘܐܦ ܥܒܕܐ (ܠܚܝܠܐ) .

ܘܦܘܫܬܐ ܗܠܝܢ ܡܦܩܝܢܐ ܕܦܥܠܝܘܬܐ ܢܘܗܪܢܝܬܐ ܘܠܐ ܢܘܗܪܢܝܬܐ ܒܡܫܪܝܐ ܕܒܝܬܐ ܗܠܝܢ :

> ܠܡܘܕܥܐ :
>
> ـ ܦܓܪܐ ܕܐܢܫܐ ܠܐ ܡܨܐ ܠܡܬܕܥܪܢܐ ܕܥܠܥܐ ܢܘܗܪܐ ܕܫܘܡܫܐ ܒܓܘܗ ، ܘܐܗܘ ܐܠܗ ܒܡܠܐ ܕܐܠܗܐ ܒܒܪܝܬܗ . ܘܗܘ ܒܗܝ ܠܘܚܐ ܡܘܒܠܐ ܐܠܗ ܠܐܢܫܐ ܐܦܪܢܣܬܐ ܡܕܒܠܢܝܬܐ ܠܡܬܕܥܪܢܐ ܕܡܘܪܟܐ ܒܓܘܐ ܘܪܚܡܐ ܘܥܘܕܪܢܐ ܡܬܚܠܦܐ ܒܡܦܠܚܢܘܬܐ ܕܢܘܗܪܐ ܕܫܡܫܐ . ܡܘܠܕܐ ܘܡܘܦܠܚܢܘܬܐ ܠܐܠܗܐ . ܗܘ ܠܟܠ ܡܢܕܡ ܡܦܝܫ ܗܠܝܢ .
>
> ـ ܐܡܪ ܡܢܝܢ ܒܟ ܡܢܐ ܚܝܘܬܐ ܗܘܪܡܘܢܐ ܗܠܝܢ .
>
> ܡܗܪܡܢܘܬܐ ܝܘܩܢܝܬܐ ܒܡ ܚܝܘܬܢܝܬܐ ؟
>
> ـ ܡܐ ܒܟ ܟܕܐ ܠܝ ܡܬܒܝܠܠܘ ܢܚܡܬܐ ܠܣܟܐ ܡܢ ܐܦܪܢܣܬܐ ܕܡܬܕܥܪܢܐ ܕܗܘܪܡܘܢܐ ؟



ܨܘܪܬܐ (١ — ٢) ܡܣܪܛܬܐ ܚܘܝܘܕܐ ܦܠܚܘܬܐ ܕܢܘܗܪܐ ܘܠܐ
ܕܢܘܗܪܐ ܠܫܘܚܠܦܬܐ ܕܚܝܠܐ ܕܢܘܗܪܐ.

٢ ـ ٣ ـ ܡܠܘܐܐ ܟܝܡܝܐ ܠܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ :

ܣܒܝܪܐ ܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ ܒܫܠܡܘܬܐ ܕܡܠܘܐܐ ܟܝܡܝܐ ܠܐ ܗܕܟܝܐ ܦܫܝܛܐ ܠܡܠܘܐܐ ܗܕܟܝܐ ܡܫܬܟܚܐ ܒܟܬܒܐ ܐܝܟ ܕܡܚܘܘܝܐ ܠܗ ܗܘܠܐ ܠܬܚܬ ܕܒܟܬܒܐ ܠܗ :

$$6CO_2 + 12H_2O \xrightarrow[\text{ܝܘܪܩܢܐ}]{\text{ܢܘܗܪܐ}} C_6H_{12}O_6 + 6O_2 + 6H_2O$$

ܘܡܢ ܡܠܘܐܐ ܟܝܡܝܐ ܐܝܟ ܕܟܬܝܒܐ ܒܐܗܐ ܡܥܒܕܢܘܬܐ ܝܠܗ :

٢ ـ ٣ ـ ܩܢܝܐ :

ܝܠܗ ܚܕ ܡܠܘܐܐ ܟܝܡܝܐ ܐܡܝܢܐ ܠܗ ܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ ܠܢܒܬܐ ܝܪܘܩܬܐ ܘܚܝܘܬܐ . ܒܪ ܟܝܢ ܡܢܝܬܐ ܐܪܝܟܬܐ ܠܝܡܐ ܡܢ ܚܟܡܬܐ ܒܡܫܬܟܚܢܘܬܐ ܕܒܝܬܐ . ܘܡܢ ܒܬܪ ܗܕܟ ܡܬܝܢ ܡܢܐ ܒܡܫܬܟܚܢܘܬܐ ܕܝܘܪܩܐ ܕܡܫܚܐ ܠܢܡܐ ܘܬܪܬ ܗܕܟ ܠܚܕܘܪܐ ܠܗ ܚܕܐ ܕܚܕܘܪܐ . ܘܡܢܝܗ ܡܬܝܢ ܠܡܘܪܐ ܡܫܬܟܚܢܐ ، ܡܣܘܦܠ ܚܕܝܢܬܐ ܒܦܠܚܝܢܬܐ ܝܪܘܩܬܐ . ܘܚܝܘܬܐ ܦܪܝܫ ܡܢܐ ܠܗ ܦܠܚܝܢܬܐ . ܐܝܟ ܕܝܠܗ ܡܫܬܚܠܦܐ ܠܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ .

ܐܝܢܐ ܒܢܒܬܐ ܡܢܝܬܐ ܘܚܝܘܬܐ . ܡܢܐ ܦܪܝܫ ܠܗ ܠܗܘܢܐ ܒܡܪܟܒܝܬܐ ܡܣܪܩܝܬܐ . ܘܡܬܢ ܠܦܠܚܝܢܬܐ ܝܪܘܩܬܐ . ܘܐܦ ܕܚܝܘܬܐ ܠܡܣܪܐ ܒܡܫܘܚܬܐ ܒܡܪܟܒܬܐ ܡܢ ܡܢܐ . ܐܝܢܐ ܒܡܫܘܚܬܐ ܕܡܢܐ . ܗܝ ܕܟܠܟܕܐ ܒܡܪܟܒܝܬܐ ܠܗ ܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܠܐ ܝܘܕܥܐ ܠܗ . ܡܢ ܡܢܐ ܠܡܣܪܐ . ܒܪ ܦܬܐ ܡܫܬܠܡܬܐ ܕܗܘܬܐ ܕܡܢܐ ܠܡܣܪܐ ܒܐܘܟܡܐ ܕܗܘܦܐ ܒܢܘܪܐ ܕܐܘܪܟܬܐ ܕܐܝܬ ܟܠ ܥܝܢܐ ܕܚܕܘܪܐ . ܠܗ ܡܥܒܕܢܘܬܐ ܕܒܪܝܐ .

ܘܡܢܐ ܕܡܦܠܚܠܗܘܢ . ܚܝܘܬܐ ܝܪܘܩܬܐ ܘܚܝܘܬܐ ܠܗ ܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ ܝܠܗ ܡܥܘܪܢܐ ܠܗܕܘܡܐ ܐܢܫܐ ܠܡܘܕܥܐ ܕܐܬܪܐ ܘܟܝܢܐ ܕܒܪܝܐ . ܒܦܠܚܘܬܐ ܠܐ ܒܢܘܗܪܐ ܡܢ ܡܥܒܕܢܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ .

ܐܢ̈ܐ ܒܗܘ ܣܘܓܐܐ ܐܓܪܐ ܕܒܟܬܪ̈ܝܐ . ܐܝܟ ܕܩܝܡܝܢ ܒܦܟܘܪܘܬܐ ܕܒܢܝܐ ܒܢܘܗܪܐ . ܐܝܟ ܠܐ ܡܩܒܠܝܢ ܡܢܐ ܒܗܘ ܦܟܘܪܘܬܐ (ܐܝܟ ܡܩܘܡܬܐ ܠܗܝܕܪܘܓܝܢ) ܐܠܐ ܒܗ ܡܩܒܠܝܢ ܕܘܟܬܐ ܐܚܪܢܐ ܐܝܟ ܟܣܘܠܐ ܦܝܫܬܐ . ܐܘ ܣܥܘܪܐ ܗܝܕܪ̈ܝܐ . ܐܘ ܡܠܘܐܐ ܠܐ ܗܝܕܪ̈ܝܐ . ܐܝܟ ܒܟܬܪ̈ܝܐ ܕܗܝܕܪܘܓܝܢ (H_2O) . ܐܝܬܝܗ ܠܗ ܐܢܬܝܘܬܐ ܕܒܟܬܪ̈ܝܐ ܕܒܟܬܝܪܬܐ ܢܦܘ ܦܝܫܐ ܢܠܗ ܡܘܒܝܠܐ ܒܝܬ ܐܪܥܐ ܗܘܠܢܬܐ ܕܒܐܬܪܐ ܗܢܐ :

ܒܟܬܪ̈ܝܐ ܕܟܒܪܝܬܐ :

ܢܘܗܪܐ

$$2H_2S + CO_2 \longrightarrow 2S + (CH_2O) + H_2O$$

ܡܘܪ̈ܢܐ (ܟܠܘܪܘܦܝܠ)

ܒܢܨܒܐ ܝܪܘܩܐ ܘܫܚܝܡܐ :

ܢܘܗܪܐ

$$2H_2O + CO_2 \longrightarrow O_2 + (CH_2O) + H_2O$$

ܡܘܪ̈ܢܐ (ܟܠܘܪܘܦܝܠ)

ܘܡܘܬܒܠܗ ܢܕܘܥܐ ܒܪ ܢܝܠ (Van Neil) ܗܘܠܢܬܐ ܟܠܢܝܬܐ ܠܦܟܘܪܘܬܐ ܕܒܢܝܐ ܒܢܘܗܪܐ ܐܝ. ܒܢܨܒܐ ܢܕܘܡܢܐ . ܐܘ ܫܚܝܡܐ ܐܘ ܒܟܬܪ̈ܝܐ ܢܕܘܡܬܐ ܐܝܟ ܕܒܐܬܪܐ ܢܠܗ :

$$2H_2A + CO_2 \longrightarrow 2A + (CH_2O) + H_2O$$

ܟܕ (H_2O) ܡܬܒܥܐ ܒܠ ܕܘܟܬܐ ܕܡܩܘܡܬܐ ܗܘܪܐ ܕܗܘܒܠ ܗܕܪ (H_2O) . ܘܡܢ ܗܘܠܢܬܐ ܠܟܠ ܒܢܝܢ ܕܐܘܟܝܓܝܢ ܦܠܝܛܐ

ܦܘܛܘܣܢܬܐ ܕܟܠܝܬܐ ܢܘܗܪܐ ܒܟܠܝܬܐ ܘܡܫܚܠܦܐ ܠܟ ܡܢ ܡܢܐ . ܘܠܐ ܡܢ ܗܕܝܢ ܐܘܟܣܓܝܢܐ ܕܦܪܩܦ .

ܘܡܚܘܝܕܠܗ ܠܗܘ . ܒܡܦܠܚܬܐ ܕܫܘܢܝܐ ܡܘܠܝܕܢܝܬܐ (Radioactive elements) . ܘܐܝܟ ܦܝܫ ܗܘܐ ܡܘܦܠܚܐ (H_2O^{16}) ܗܘ ܕܐܝܬ ܠܗ ܗܘ ܦܘܚܡܐ ܢܘܗܪܐ ܠܐܘܟܣܓܝܢ (O^{18}) ܫܠܦ (H_2O) ܒܗܘ ܐܗܘ ܗܘܐ ܐܘܟܣܓܝܢ ܦܠܛܐ ܟܠܗ ܡܢ ܐܕܫܐ ܡܘܠܝܕܢܐ . ܐܝܟ ܕܗܘ ܡܚܘܝܐ ܠܗ ܡܢ ܗܘܠܟܐ ܕܐܬܪܐ ܠܗ :

ܢܘܗܪܐ

$$2H_2O^{16} + CO_2 \longrightarrow O_2^{16} + (CH_2O) + H_2O$$

ܡܘܪܩܢܐ (ܟܠܘܪܘܦܝܠ)

ܐܝܢܐ ܕ . ܦܝܫ ܗܘܐ ܡܘܦܠܚܐ (CO_2^{18}) ܫܠܦ (CO_2) ܒܢܕܝܐ ܘܡܢܐ ܒܢܕܝܐ (H_2O) . ܒܗܘ ܗܘܐ ܟܠܗ ܐܘܟܣܓܝܢ ܦܠܛܐ . ܗܟܝܠܐ ܡܢ ܡܘܠܝܕܢܘܬܐ ܐܝܟ ܕܐܬܪܐ ܠܗ :

ܢܘܗܪܐ

$$2H_2O + CO_2^{18} \longrightarrow O_2 + (CH_2O^{18}) + H_2O^{18}$$

ܡܘܪܩܢܐ

٢ — ٣ — ٢ - ܡܕܝܢܘܬ ܐܘܟܣܓܝܢܐ ܕܦܪܩܦ :

ܘܗܘ ܝܠܗ ܡܠܐܐ ܡܕܡܝܐ ܝܡܝܐ ܐܣܕܝܐ ܠܦܘܛܘܣܢܬܐ ܕܟܠܝܬܐ ܢܘܗܪܐ . ܘܡܢܝܠܗ ܢܟܝܬܐ ܡܢ ܡܣܕܘܪܐ ܢܕܪܐ . ܟܕ (CO_2) ܝܠܗ ܚܕ ܡܢ ܡܟ ܕܗܘܐ . ܘܡܛܝܐ ܦܣܡܘܬܗ ܠ ٣٠ ٪ . ܟܕ ܡܕܝܢܘܬ ܐܘܟܣܓܝܢܐ ܕܦܪܩܦ . ܠܐܪܥܐ ܒܝܘܪܬܐ ܕܟܝܢܬܐ ܒܐܘܪܚܐ ܕܡܘܪܟܬܐ ܦܪܝܫܐ ܟܠ ܝܘܡܢܐ ܕܐܪܥܐ . ܐܝܟ ܕܟܝܘܪ ܚܝܠܗ ܠܗ ܘܡܘܪܐ ܕܐܪܥܐ . ܘܦܪܝܫ ܠܗ ܡܟܝܢܐ ܒܢܝܐ ܠܒܘܪܬܐ ܕܘܡܘܪܐ ܡܝܬܢܐ .

ܘܟܕ ܗܘܦܐ ܕܡܕܝܢܘܬ ܐܘܟܣܓܝܢܐ ܕܦܪܩܦ . ܗܟܝܠܐ ܠܕܘܡܝܐ ܝܠܗ ܒܡܢܐ . ܗܘ ܦܪܫ ܠܕܠܝܠܘܬܐ ܠܗ ܒܘܕܐ ܕܐܝܟܐ ܠܒܘܪܬܐ ܕܘܡܘܪܐ ܡܝܬܢܐ .

ܘܡܛܝܐ ܠܦܠܓܗ ܕܝܘܡܐ ܕܐܘܡܢܝܐ . ܕܡܬܬܘܣܦ ܒܗ ܥܒܕܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ .

٢ — ٤ ـ ܥܠܠܐ ܕܡܫܚܠܦܝ ܒܥܒܕܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ :

ܡܫܚܠܦܝ ܟܠܐ ܡܢ ܥܠܠܐ ܒܡܘܪܟܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܘܡܫܚܠܦܢܘܬܐ ܕܟܠܝܐ ܥܠܠܐ ܥܠ ܚܕܕܐ . ܘܡܢ ܐܢܐ ܥܠܠܐ ܒܝܬ ܐܝܠܝܢ ܝܠܗܘܢ :

٢ — ٤ — ١ ـ ܡܥܝܢܘܬܐ ܕܬܪܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ (CO 2 Concentration) :

ܬܪܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ ܝܠܗ ܐܝܟ ܐܚܐ ܡܢ ܥܠܝܡܘܬܐ ܕܚܝܐ . ܘܡܢ ܡܢܝܢܐ ܕܡܠܘܐܐ ܕܐܘܣܦܐ . ܘܡܢ ܚܕܡܢܐ ܝܬܝܪܐ ܚܘܝܪܐ ܘܥܕܡܐ ܡܢ ܡܟܘܢܐ . ܘܡܥܝܢܘܬܐ ܕܐܝܟ ܗܘܦܐ . ܗܝ ܕܦܫܬܐ ܡܬܘܡܡܬܐ ܒܐܝܟ (٠,٠٣) ܝܠܗ ܐܝܟ ܒܡܘܕܟܐ ܝܠܗ . ܘܡܠܘܟܐ ܣܘܟܠܝܐ ܝܠܗ ܚܕ ܥܠܠܐ ܠܐ ܡܬܚܡܢܐ (Kimiting Factor) ܒܗ ܥܒܕܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܘܙܝܕܬܐ ܕܡܥܝܢܘܬܐ ܕܬܪܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ ܠܚܕ ܦܟܐ . ܡܟܪܝܐ ܙܝܕܬܐ ܒܡܘܪܟܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܗܘܝܐ ܥܠܝܡܘܬܐ ܕܡܥܘܪܝܘܬܐ ܘܐܪܥܐ ܕܡܫܝܡܘܬܐ ܒܗ ܦܫܪܐ .

٢ — ٤ — ٢ ـ ܢܘܗܪܐ (Light) :

ܡܢ ܡܕܝܡ ܕܡܘܠܝ ܕܡܬܘܡܐ ܕܢܘܗܪܐ ܝܠܗ ܚܕ ܥܠܠܐ ܐܢܫܝܐ ܒܗ ܥܒܕܘܬܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܘܒܗ ܒܢܝܢܐ ܕܡܘܕܥܢܐ ܬܢܝܢܝܬܐ ܒܕ ܗܘ ܝܠܗ ܡܬܘܡܐ ܠܗܘܦܐ ܐܢܫܝܐ ܠܐܝܢܐ ܟܪܟܐ ܥܒܕܘܬܐ . ܘܦܬܝܚ ܡܦܘܠܓܐ ܬܢܝܢܐ ܠܗܘܢ ܡܬܢܝܢܝܢ ܠܥܝܢܘܬܐ ܕܢܘܗܪܐ (Light Intensity) ܬܢܝܢܐ ܕܝܠܗ ܘܬܢܝܢܐ ܕܡܥܝܢܐ . ܐܦ ܠܟܠ ܥܝܢܘܬܐ ܐܝܬ ܟܪܟܐ ܡܬܚܡܢܐ ܒܥܝܢܘܬܐ ܕܢܘܗܪܐ . ܡܛܝܐ ܒܗ ܣܘܡܟܐ ܕܡܦܠܓܐ ܒܢܝܢܐ ܒܢܘܗܪܐ . ܘܟܠ ܙܝܕܬܐ ܐܘ ܒܨܪܬܐ ܒܗܘܐ ܟܪܟܐ . ܒܕ ܡܬܢܦܩܐ ܡܢ ܡܘܪܟܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ . ܟܠ ܗܝ ܡܘܪܟܐ ܕܒܢܝܢܐ ܒܢܘܗܪܐ ܒܗ ܦܪܕܦܐ ܡܬܚܠܦܐ . ܘܐܡܝܢ ܕܐܝܬ ܟܠ

ܣܓܝܐܐ ܢܝܫܢܐ ܕܠܚܡ ܗܘܐ ܒܒܘܢܐ ܡܬܚܠܦܐ. ܘܫܪܟܐ ܕܐܝܬ ܒܕܒܪܐ ܕܥܩܪܐ. ܩܢܝ ܠܡܫܘܚܬܐ ܡܢ ܐܪܥܐ. ܢܗܝܪ ܡܢ ܗܢܐ ܕܩܢܝ ܫܪܟܐ ܡܣܬܟܝܢ ܡܫܬܘܠܠܐ ܒܐܪܥܐ ܘܫܪܟܐ ܐܚܪܢܐ.

ܘܐܦ ܠܐܪܝܟܘܬܐ ܕܠܦܐ (ܢܠܠܐ) ܐܪܥܐ ܐܝܬ ܡܥܒܕܢܘܬܐ ܥܠ ܡܙܓܐ ܕܒܢܝܐ ܐܪܥܐ. ܟܕ ܐܝܬܝܗ ܥܡܠܐ ܡܪܕܝܬܐ ܒܠܚܘܕ ܡܢ ܐܪܥܐ. ܗܘ ܕܡܙܓܐ ܚܠܘܪܘܦܝܠ ܡܢ ܠܡܙܓܐ. ܘܗܘܝܐ ܫܘܚܠܦܐ ܕܒܢܝܐ ܐܪܥܐ ܥܠ ܫܘܒܗ ܠܐܪܝܟܘܬܐ ܠܦܬܐ ܡܫܘܡܝܬܐ ܘܪܘܡܝܬܐ. ܘܒܪܐ ܒܕܪܓܐ ܒܟ ܚܠܠܐ ܠܗ ܦܐܬܐ ܒܫܘܬܝܬܐ ܘܫܪܘܟܝܬܐ. ܘܠܗܠܝܢ ܡܘܪܟܝܢ ܠܗ ܦܐܬܐ ܢܘܡܝܬܐ. ܡܢ ܙܘܪܝܬܐ ܕܒܘܪܐ ܡܬܚܝܠܐ. ܟܕ ܚܠܘܪܘܦܝܠ ܡܬܢܦܩ ܠܐܪܟܘܬܐ ܕܐܪܥܐ ܢܘܡܝܐ.

٢ — ٤ — ٣ ـ ܕܪܓܐ ܕܫܚܝܢܘܬܐ (Temperature) :

ܐܬܚܙܝ ܕܪܓܐ ܕܫܚܝܢܘܬܐ ܥܠ ܗܘܦܟܐ ܕܦܥܠܘܬܐ ܒܝܘܠܘܓܝܬܐ ܒܡܥܒܕܢܘܬܗ ܒܒܘܪܟܐ ܕܐܢܫܝܢ ܐܝܟ ܕܗܝ ܡܬܠܚܡܝܢ ܒܦܥܠܘܬܐ ܠܐ ܒܪܝܬܐ ܠܗܘܠܕܢܘܬܐ ܕܒܢܝܐ ܐܪܥܐ. ܘܐܝܟ ܡܙܓܐ ܕܐܝܬ ܗܘܠܕܢܘܬܐ ܒܫܢܬܐ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ. ܘܠܗ ܡܚܝܐ ܫܚܝܢܘܬܐ ܡܬܚܡܢܐ ܕܠܘ ܒܝܢ (١٠ ܡ° ـ ٣٠ ܡ°). ܘܐܦ ܕܢܝܫܬܐ ܕܦܝܫܬܐ ܡܪܒܝܬܐ ܒܪܝܐ ܠܗܘܢ ܐܝܬ ܗܘܠܕܘܬܐ ܐܚܘܬ ܕܪܓܐ ܫܚܝܢܘܬܐ ܒܟ ܒܙܘܥܐ ܡܢ ܡ° ܐܦ ܐܡܪ ܐܝܬ ܣܓܝܐܐ ܒܫܢܬܐ ܐܝܟ ܕܣܐܡ ܠܗ ܢܒܝܐ. ܡܢܘ ܠܫܢܬܐ ܒܢܗܘܐ ܗܘܠܕܘܬܐ ܠܗ ܕܪܓܐ ܫܚܝܢܘܬܐ ܚܠܦ ܒܠܚܘܕ ܡܨܝܐ ܠ ܡ° ܐܘ ܢܗܝܪ. ܘܠܟܠ ܢܝܫܬܐ ܐܝܬ ܕܪܓܐ ܫܚܝܢܘܬܐ ܦܘܫܝܐ ܗܘܐ ܠܗܘ ܗܘܠܕܘܬܐ ܕܒܢܝܐ ܐܪܥܐ ܥܠ ܫܘܒܗ.

٢ — ٤ — ٤ ـ ܡܝܐ (Water) :

ܐܬܚܙܝ ܡܝܐ ܒܡܙܓܐ ܕܒܢܝܐ ܐܪܥܐ ܒܐܘܪܚ ܦܪܝܫܬܐ. ܘܗܝ ܢܠܗ ܐܝܟ ܗܘܡܐ ܐܢܫܝܐ ܠܗ ܦܥܠܘܬܐ ܐܪܥܝܬܐ. ܘܐ· ܒܙܪܥܐ ܒܡܚܘܬܗ ܡܢ ܗܝܕܘܟܝܢ ܐܢܫܝܐ ܠܦܥܠܘܬܐ ܠܐ ܐܪܥܝܬܐ ܡ ܗܘܠܕܘܬܐ. ܘܐܦ ܒܡܙܓܐ ܕܡܝܐ ܡܬܒܪܐ ܡܠܠܬܐ ܕܐܪܟܐ ܘܡܝܐ (Turgorpressure) ܠܗܘܠܕܬܐ ܫܠܘܪܝܬܐ. ܐܝܟ ܒܫܪܝܗ ܡܥܒܕ ܕܒܢܝܬܐ ܕܗܘܪܟܬܐ. ܘܡܪܝܐ ܡܢ ܗܢ

ܡܠܝܘܬܐ ܕܣܘܠܦܐ ܕܗܘܦܐ . ܘܚܝܪܐ ܚܒܪܬܐ ܕ CO_2 ܠܡܘܪܐ ܕܝܒܪܘܦܐ .
ܘܚܣܪܬܐ ܚܕܐ ܥܘܢܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ . ܘܟܕ ܗܘ ܡܠܝܠܘܬܐ ܕܡܝܐ ܠܗ
ܚܘܪܬܐ ܕܝܡܘܪܐ ܕܝܒܪܘܦܐ . ܡܚܕܢܐ ܚܡܥܡܘܬܐ ܕܚܘܪܬܐ ܕܐܗܐ ܝܡܘܪܐ .
ܡܚܡܘܕܐ ܥܠ ܣܘܬܢܘܬܐ ܕܦܪܘܛܘܦܠܣܬܐ ܘܡܥܒܕܘܬܗ . ܘܡܚܡܘܕܐ
ܒܐܗܐ ܦܘܠܚܢܐ ܥܠ ܡܝܪ̈ܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ .

٢ — ٤ — ٥ - ܡܠܝܫܐ ܝܩܕܢܐ ܠܗ ܢܘܗܪܐ :

ܡܚܡܕ ܚܘܪܬܐ ܕܝܕܥܢܐ ܐܣܛܘܡܟܐ ܝܩܕܢܐ ܗܘܡܐ ܠܕܘܟܬܐ ܠܗ ܢܘܗܪܐ
ܕܢܦܩܬܐ ܐܝܟ ܦܪܘܠܐ ܘܡܓܢܣܘܬܐ ܘܡܕܪܘܟܝܢ . ܠܡܠܠܬܐ ܕܒܢܢ̈ܐ ܕܡܠܘܐܐ
ܗܢܐ ܕܡܠܘܪܘܦܠ . ܠܗ ܦܠܠܝܘܬܐ ܟܠܘܪܬܐ ܠܫܘܪܘܬܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ
ܐܝܟܢܐ ܦܘܣܦܘܪ ܢܚܕ ܚܕܘܟܬܐ ܕܟܠ ܡܢ ܐܚܘܠܘܙܐ ܗܕܝܢ ܦܘܣܦܛܐ (
Ribulose ı ܘ D iphosphate) ، ܘܡܠܝܬܐ ܦܘܣܦܛܐ ܕܐ
ATP) ، ܘܐܝܟ ܝܠܝܗ ܗܕܝܢ ܐܘܟܬܐ ܕܡܬܘܟܦ ܠܗ ܫܘܪܘܬܐ ܕܒܢܢ̈ܐ
ܟܠܘܪܐ . ܐܝܟ ܕܡܘܟܝܠܘ ܢܕܝܥܝܢ ، ܐܝܟܢܐ ܡܢܝܢܘ ܘܡܓܢܣܘܬܐ . ܐܝܟ
ܡܚܡܕ ܚܢܓܘܪܘܬܐ ܕܐܢܝܫܐ ܐܢܫܝܐ ܠܦܠܠܝܘܬܐ ܟܠܘܪܬܐ ܘܠܐ
ܟܠܘܪܬܐ ܡܢ ܫܘܪܘܬܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ .

٢ — ٤ — ٦ - ܢܫܘܡܬܐ ܐܣܝܪܬܐ :

ܗܢܐ ܐܝܬ ܢܫܘܡܬܐ ܐܣܝܪܬܐ ܕܒܐ ، ܡܚܡܕ ܗܘܚܡܕܐ ܡܣܪܢܢ̈ܐ ܥܠ
ܡܝܪ̈ܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ ، ܘܡܦܩܪܐ ܠܗ ܗܘܐ ܘܗܢܐ ܕܡܝܪܢܐ . ܘܡܚܡܠܬܐ
ܚܡܘܚܕܢܐ . ܚܠܝܗ ܡܚܕܝ ܕܒܪܬܐ ܕܦܬܚܐ ܕܗܘܪܬܐ . ܘܐܗܐ ܡܚܡܕܐ
ܥܠ ܚܒܪܬܐ ܕܗܕܝܬ ܐܘܚܡܕܐ ܕܒܪܚܘ. ܠܡܘܪܐ ܕܝܒܪܘܦܐ . ܘܚܣܪܬܐ
ܥܠ ܡܝܪ̈ܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ . ܘܡܚܝܪܝ ܡܕܝܢܐ ܕܢܚܝܬܐ ܐܦ ܡܢ ܡܝܪ̈ܐ ܕܒܢܢ̈ܐ
ܟܠܘܪܐ ، ܘܡܕܝܢܐ ܦܝܠܘܪܬܢܐ ܐܘ ܟܚܡܪܢܐ ܐܘ ܪܝܒܐ (ܟܒܪܘܫܐ) . ܐܝܟ
ܕܡܣܒ ܠܝܒܪܘܦܐ . ܟܠܗܐ ܡܚܕܝ ܚܘܪܬܐ ܚܡܝܪ̈ܐ ܕܒܢܢ̈ܐ ܟܠܘܪܐ .

ܘܐܦ ܟܣܠܦܬܐ ܕܗܘܐ ܕܢܘܗܪܐ . ܐܘܟܝܬ ܦܪܝܬܐ ܕܐܘܟܣܝܓܝܢ ܣܕܪ ܥܕܟܐ
، ܡܚܡܕܐ ܥܠ ܠܡܝܪܬܐ ܕܡܢܐ ܕܡܠܝܫܐ ܠܗ ܢܘܗܪܐ . ܥܠ ܕܐܗܐ ܠܐ ܦܪܝܬܐ
ܕܐܘܟܣܝܓܝܢ ، ܕܐ ܡܚܝܪܬܐ ܡܢ ܡܝܪ̈ܐ ܕܠܡܝܪܬܐ . ܘܟܕ ܟܝܪ ܡܝܪ̈ܐ ܕܒܢܢ̈ܐ
ܟܠܘܪܐ .

٢ — ٤ — ٧ ـ ܩܡܘܠܐ ܠܚܡܐ :

ܐܚܪܢ ܡܢܝܢܐ ܕܒܢܝܐ ܒܣܘܪܐ ܒܡܘܟܠܐ ܕܐܟܘܠܐ ܡܢ ܠܒܪܐ ܕܡܠܚܡܘܬܐ ܕܚܘܡܬܐ ܕܡܘܦܝܠ ، Cuticle ، ܐܠܐ ܦܠܚܘ . ܘܡܢܝܢܐ ܕܡܘܪܟܒܬܐ ܐܠܐ ܕܪܘܚܝܢ ܒܝܫܬܐ . ܘܡܠܚܡܘܬܐ ܕܒܝܠܝܐ . ܘܪܘܡܒܐ ܕܡܘܪܬܐ ܕܡܣܘܬܐ ܡܢܝܢܐ ، ܡܣܘܦܝܠ ، ܘܡܢܝܢܐ ܕܦܠܚܝܬܐ ܒܪܘܡܫܬܐ . ܘܡܡܫܘܬܐ ܕܠܦܪܘܦܝܠ ܠܗܘ . ܘܐܝܟܢ ܡܘܪܟܐ ܕܐܬܘܡܝܐ ܐܢܫܝܐ ܠܒܢܝܐ ܡܠܦܐܐ ܕܠܦܪܘܦܝܠ . ܘܐܦ ܐܢܫܝܐ ܐܚܪܢܐ . ܠܗ ܦܠܚܘܬܐ ܕܒܢܝܐ ܒܣܘܪܐ . ܐܠܐ ܡܢܝܢܐ ܕܐܝܟ ܗܠܦܘܬܐ .

٣ ـ ܒܢܝܢܐ ܟܝܡܝܝܐ (Chemosynthesis) :

ܘܦܠܚܘܬܐ ܕܒܢܝܐ ܒܣܘܪܐ . ܐܝܟ ܗܝ ܐܘܪܚܐ ܒܝܕ ܐܢܫܝܐ ܡܢ ܐܘܪܚܐ ܕܡܬܪܦܣܘܬܐ ܡܬܢܝܬܐ ܠܗ ܐܝܬܝܐ ܚܝܐ . ܐܝܟܐ ܠܐ ܐܝܟ ܗܝ ܠܣܘܪܝܬܐ . ܘܐܡܪܐ ܐܝܬ ܚܕܡܢܐ ܐܢܫܐ ܕܒܩܛܪܝܐ . ܡܢܝܢ ܠܡܬܪܨܬܐ ܕܐܘܪܦܝܣ ܒܗܘܒܠܐ ܢܘܬܐ ܡܪܝܬܐ ܒܢܝܢܐ ܟܝܡܝܝܐ . ܒܪܐ ܠܗܘ ܗܘ ܒܢܝܢܐ ܕܡܬܚܘܝܢܐ ܗܘܪܡܝܢܐ ܠܐ ܗܘܪܡܢܝܐ ܒܠܒܝܒܘܬܐ ܕܒܣܪܐ . ܘܠܡܫܡܫܘ ܒܗܝ . ܘܠܐ ܠܒܩܛܪܝܐ ܐܦܩܬܐ ܕܚܕܡܢܐ ܪܘܒܐ ܟܝܡܝܐ ܠܐ ܗܘܪܡܢܐ . ܠܡܫܝܐ ܕܬܘܩܦܐ . ܐܝܟ ܚܘܠܦܐ ܠܬܘܩܦܐ ܒܣܘܪܐ .

ܘܡܢ ܐܢܫܐ ܕܒܩܛܪܝܐ ܐܝܟ ܕܡܢܝ ܐܦܩܬܐ ܕܐܢܐ ܪܘܒܐ :

٣ — ١ ـ ܒܩܛܪܝܐ ܕܢܝܛܪܝܛ (ܢܝܛܪܘܣܘܡܘܢܣ)

: (Nitrosomonas)

ܘܒܠܝܫ ܐܢܫܐ ܡܢ ܒܩܛܪܝܐ ܕܢܝܛܪܝܛܐ ، ܐܝܬ ܠܗ ܚܝܠܐ . ܘܡܢ ܡܬܚܦܟ ܠܐܡܘܢܝܐ (NH_3) ܠܢܝܛܪܝܛܐ (NO_2) ܒܡܫܚܠܦܘܬܐ ܕܐܘܟܣ ܒܗܘܦܠܐ ܕܒܐܬܪܐ ܗܢܐ :

$$2\ NH_3 + 3O_2 \xrightarrow[\text{ܐܢܙܝܡܐ}]{\text{ܒܩܛܪܝܐ}} 2N\ 2 + 2H_2O + 2H^+ + \text{ܚܝܠܐ}$$

٣ — ٢ - ܒܲܟܬܹܝܪܝܵܐ ܕܢܝܼܛܪܵܬܹܐ (ܢܝܼܛܪܘܿܒܲܟܬܹܪ) (Nitrobacter) :

ܘܝܼܠܗܘܿܢ ܚܲܕ ܓܸܢܣܵܐ ܐܚܹܪܢܵܐ ܡܢ ܒܲܟܬܹܝܪܝܵܐ ܕܢܝܼܛܪܵܝܬܵܐ . ܐܝܼܬ ܠܗܘܿܢ ܚܲܝܠܵܐ ܘܡܫܲܚܠܦܝܼ ܢܝܼܛܪܵܝܬܵܐ - (NO_2) ܠܢܝܼܛܪܵܬܵܐ - (NO_3) ܐܲܝܟ ܕܡܘܿܚܘܝܵܬܵܐ ܕܒܵܬܪܵܐ ܗܵܠܹܗ :

ܒܲܟܬܹܝܪܝܵܐ

$$2\quad N_{2} + O2- \xrightarrow{\hspace{3cm}} 2N_{3}^{-} + \text{ܚܲܝܠܵܐ}$$

ܢܝܼܛܪܵܬܵܐ

ܒܲܪ ܩܵܠܝܼܬ ܚܲܕ ܟܲܡܘܼܬܵܐ ܡܢ ܚܲܝܠܵܐ ܒܦܘܼܠܚܵܢܵܐ ܡܕܲܡܝܵܐ . ܘܟܲܡܘܼܬܵܐ ܐܚܹܪܢܵܐ ܒܦܘܼܠܚܵܢܵܐ ܕܓܵܪܡܵܐ .

٣ — ٣ — ܒܲܟܬܹܝܪܝܵܐ ܕܟܸܒܪܝܼܬܵܐ :

ܩܪܝܼܢܵܐ ܐܝܼܬܘܿܗܝ ܒܘܼܚܕܵܢܵܐ ܐܲܝܟ ܕܐܝܼܬ ܠܗܘܿܢ ܚܲܝܠܵܐ ܕܡܫܲܢܹܐ ܟܸܒܪܝܼܬܵܢܵܝܬܵܐ . ܘܡܫܲܚܠܦܝܼ ܒܐܲܫܟܵܚܬܵܐ ܕܟܸܒܪܝܼܬܵܝܬܵܐ ܕܡܝܼܕܪܘܿܓܹܝܢ (H_2S) ܠܟܸܒܪܝܼܬܵܐ ܘܡܝܵܐ . ܘܩܵܠܝܼܬ ܒܐܝܼܕܵܐ ܗܵܕܹܐ ܫܘܼܚܠܵܦܵܐ ܚܲܝܠܵܐ ܒܣܡܝܼܢܵܐ . ܩܢܹܝ ܡܘܿܩܠܝܼܢ ܠܡܲܕܒܲܚܬܵܐ ܕ CO_2 ܒܡܝܼܕܪܘܿܓܹܝܢ ܕܟܸܒܪܝܼܬܵܝܬܵܐ ܕܡܝܼܕܪܘܿܓܹܝܢ . ܠܡܲܛܪܲܬܵܐ ܕܚܲܕ ܕܘܼܟܬܵܐ ܦܪܝܼܡܵܐ . ܡܲܣܩܵܢܹܐ ܠܚܲܝܠܵܐ . ܐܲܝܟ ܕܡܘܿܚܘܝܵܬܵܐ ܕܒܵܬܪܵܐ ܗܵܢܵܐ :

ܒܲܟܬܹܝܪܝܵܐ

$$2\quad H\quad 2S2 \xrightarrow{\hspace{3cm}} 2S + 2H2O + \text{ܚܲܝܠܵܐ ܒܣܡܝܼܢܵܐ}$$

ܟܸܒܪܝܼܬܵܐ

ܒܲܟܬܹܝܪܝܵܐ

$$2\,H_2S + CO_2 \xrightarrow{\hspace{3cm}} (CH_2O) + H_2O + 2S$$

ܒܣܡܝܼܢܵܐ

ܕܘܼܟܬܵܐ ܦܪܝܼܡܵܐ

(ܚܲܕܒܘܿܣܪܵܬܵܐ)

ܘܒܪ ܐܝܢܐ ܐܝܬܝܐ ܩܢܝ ܠܗܘܦܩܝܗ ܐܢܪܓܝܐ ܡܢ ܐܟܣܕܬܐ ܕܪܘܟܒ̈ܐ ܠܐ ܗܘܝܢ̈ܐ ܦܥܝܠܬܐ، ܘܡܦܩܠܣܘܢ ܠܗ ܪܘܟܒ̈ܐ ܕܪܘܟܒ̈ܐ ܗܘܝܢ̈ܐ. ܥܠ ܕܐܗܐ ܐܝܢ ܦܝܫܐ ܫܡܐ ܕܝܠܗ ܕܐܝܬܝܐ ܢܦܫܝܢ ܡܬܪܣܝܢܘܬܐ. ܟܝܡܝܢܝܐ . Chemoautotrophs

٤ ـ ܡܬܪܣܝܢܘܬܐ ܠܐ ܢܦܫܝܬܐ : Heterotrophic Nutrition

ܦܝܫ ܡܘܕܝܢܐ ܚܝܘ̈ܬܐ ، ܗܘܝܐ ܠܐ ܢܦܫܢ ܡܬܪܣܝܢܘܬܐ ، ܥܠ ܟܠܝܗ ܐܝܟܐ ܐܝܟܢ ܕܠܐ ܡܨܝ ܠܡܥܒܕܬܐ ܕܡܘܪܣܝܢܗ ܒܢܦܫܗ. ܡܛܠ ܐܝܢ ܠܗܠܗܘܢ، ܡܣܝܟܐ ܠܡܝܬܐ ܥܠ ܐܣܠܦܬܐ ܕܡܠܘܐܐ ܡܪܡܝܐ ܦܥܝܠܐ ܠܡܠܘܐܐ ܡܫܬܪܝ ܪܘܟܒ̈ܐ ܕܡܦܝܫܝ ܠܗܘܦܩܐ. ܘܥܠ ܕܐܗܐ ܗܢܕܝ ܐܝܬ ܚܝܐ ܒܡܬܪܣܝܢܘܬܝܗ ܥܠ ܢܫܡܬܐ ܡܣܪܝܢܝܐ. ܐܘ ܥܠ ܐܣܪܐ ܡܢ ܚܝܘܬܐ ܐܘ ܥܠ ܓܪܘܡܗ ܐܪܥܐ ܒܘܢܝܐ. ܘܫܒܝܢ ܟܠܝܗ ܚܝܘܬܐ ܘܦܠܘܪܬܢܝܬܐ، ܘܪܘܒܐ ܕܐܪܥܐ ܕܒܚܪܬܐ،

ܘܚܝܘܬܐ ܕܡܬܪܣܝܢ ܥܠ ܢܫܡܬܐ ܟܠܝܗܘܢ ܐܝܬܠܗܘܢ ܚܘܠܡܐ ܕܠܝܫܐ ܒܢܝܗ، ܕܠܐ ܠܡܥܠܬܐ ܕܡܘܪܣܝܢܗ ܢܝܫܢܝܬܐ. ܘܚܝܘܬܐ ܐܚܪܢ ܕܡܬܟܠܝܢ ܒܡܝܬܐ ܠܡܘܪܣܝܢܗ ܡܢ ܐܣܪܐ ܡܢ ܚܝܘܬܐ ܐܚܪܢܐ ܐܝܠܗܘܢ، ܐܘܪܚܐ ܕܠܝܫܬܐ ܒܟܠ ܐܪܥܐ ܡܢܝܗ، ܐܝܟ ܠܘܚܬܐ ܘܡܘܡܬܐ ܡܘܢܘܬܐ ܘܐܡܘܬܐ ܘܦܪܝܡܝܗ. ܐܝܟܐ ܚܝܘܬܐ ܕܗܘܐ ܗܘܪܣܝܢܗ ܚܝܘܬܢܝܐ ܘܢܒܬܢܝܐ ܒܣܪܐ ܪܒܝܐ. ܐܝܢ ܐܝܬܠܗܘܢ، ܥܘܠܐ ܡܟܘܬܪܐ ܡܢ ܗܕܟ ܐܪܥܐ ܡܕܒܪܐ. ܒܐܘܪܚܐ ܕܥܡܠܬܐ ܕܗܘܪܣܝܢܐ. ܘܟܠܗ ܪܒܝܬܐ ܒܝ ܢܘܒܕܐ ܐܠܗ ܡܢ ܟܠܝܗ ܐܝܟܐ ܡܢ ܚܝܘܬܐ ܕܢܝܫܝܗ ܥܠ ܓܪܘܡܗ ܐܪܥܐ ܡܢ ܗܘܪܣܝܢܐ. ܘܠܐܪܐ ܐܠܗ ܚܕ ܚܘܡܪܐ ܠܐܘܪܚܐ ܕܥܡܠܬܐ ܕܗܘܪܣܝܢܐ. ܠܝܬ ܚܕܟܡܐ ܐܝܟܐ ܚܝܐ ܠܐ ܢܦܫܢ ܡܬܪܣܝܢܘܬܐ.

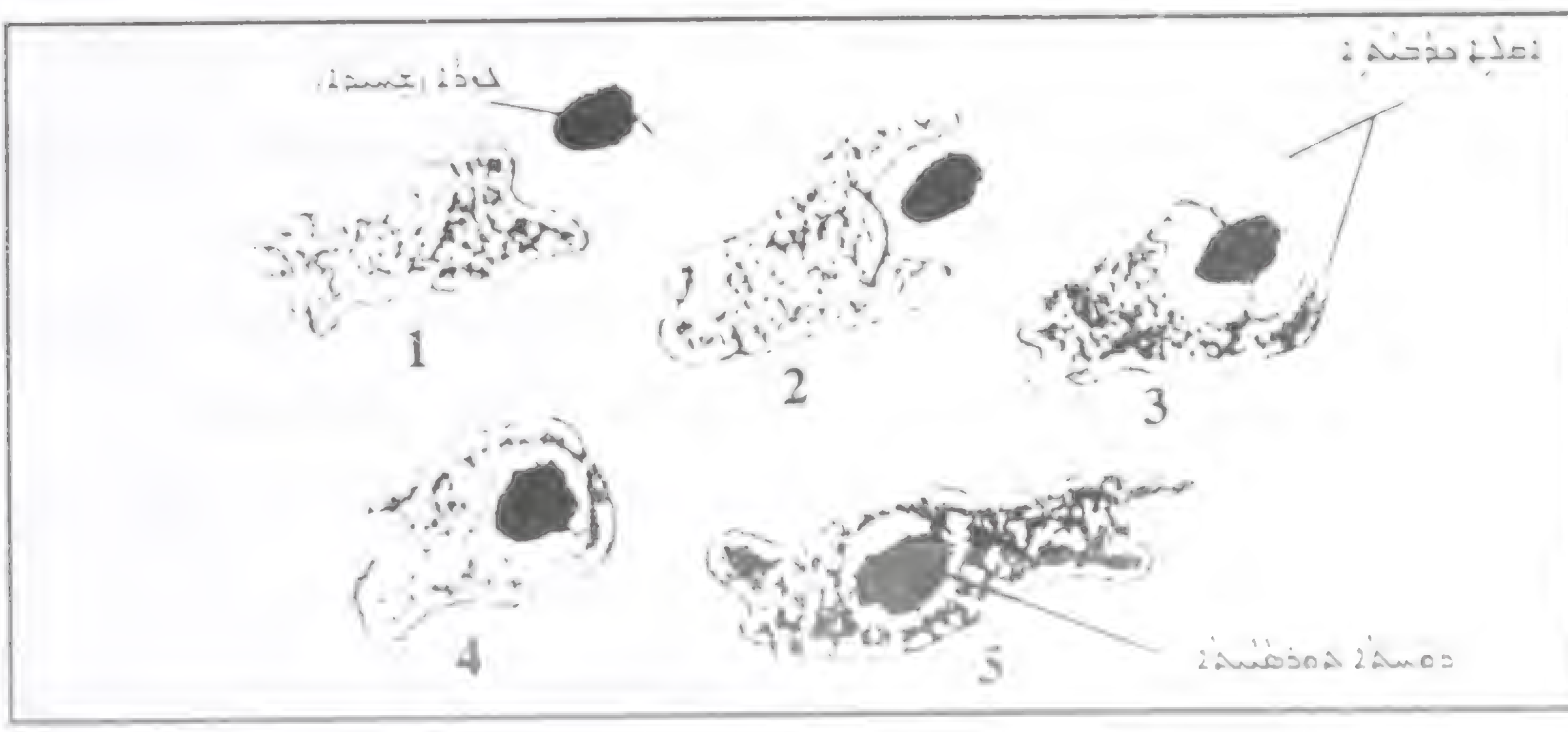
٤ ـ ١ ـ ܦܘܠܚܢܐ ܠܚܕܟܡܐ ܐܘܪܚܐ ܕܥܡܠܬܐ ܕܗܘܪܣܝܢܐ :

٤ ـ ١ ـ ١ ـ ܐܡܝܒܐ ܚܕܪܬܐ (Amoeba Proueus) :

ܗܢܐ ܐܡܝܒܐ ܚܕܪܬܐ ܠܗ ܡܢܐ ܕܪܝܫܝܬܐ ܘܡܝܬܝܐ ܘܗܘܪܟܬܐ. ܘܐܠܗ ܡܢ ܫܠܡܐ ܕܒܪܝܬܐ ܩܘܡܐ ܕܪܘܫܡܬܐ ، Protozoa ، ܐܪܥܐ ܕܚܕܪܢܬܐ ، Sarcodina ، ܘܣܘܟܝܬܐ ܐܠܗ ܡܢ ܚܝܘܬܐ ܚܕܪܢܝܬܐ ܚܘܪܬܐ ،

Unicellular) . ܡܫܚܠܦ̈ܢ ܐܣܟܡ̈ܐ ܕܗܕܡ̈ܝܗ̇ ܒܓܘܫܡܗ̇ ܡܫܚܬܐ . ܘܗܝ ܙܒܢ̈ܐ ܐܚܪ̈ܢܐ ܦܪ̈ܝܫܐ ܡܢ ܚܕܐ ܚܕܐ . ܐܝܟ ܐܡܝܒܐ ܘܐܘܓܠܢܐ (ܦܐܪܡܝܣܝܘܡ ܘܦܠܐܣܡܘܕܝܘܡ ܡܢ ܗܠܝܢ . ܘܣܓܝ̈ܐܐ ܐܚܪ̈ܢܐ ܡܢ ܗܘܠܝܬܐ ܚܝܘܬܐ) ܘܡܫܚܠܦܬܐ . ܘܡܢܗܘܢ ܠܐܠܐܠܐ ܡܫܝܚܐ ܡܢ ܦܪܘܛܘܙܘܐ ܐܘ ܡܠܠܝܢܐ ܢܘܟܪܝܐ

ܐܝܟ ܕܡܫܡܗ ܐܣܟܡܐ ܒܡܫܠܡܐ ܕܗܕܡ̈ܝܗ̇ . ܗܝ ܡܬܕܪܟܐ ܚܕ ܒܘܢܝܐ ܡܢ ܐܡܠܐ ܕܪܓܠ̈ܐ (Pseudopodia) ܕܒܕܝܐ ܒܗ ܡܢ ܚܠܝܘ ܠܒܪ̈ܝܐ ܒܐܣܟܡܐ ܕܓܒܐ . ܒܗܕ ܗܕܐ ܡܣܬܪܩ ܐܣܟܡܬܐ ܕܐܡܠܐ ܕܪܓܠܬܐ ܡܬܡܕܒܪܢܘܬܐ . ܒܗ ܡܬܕܪܟܐ ܚܕܐ ܟܘܫܬܐ ܗܕܡܝܬܐ (Food Vacuole) . ܒܣܓܝ̈ܐܐ ܒܗܠܝܢ ܗܕܡ̈ܐ ܘܚܕܟܡܐ ܡܢܐ ܐܝܟ ܕܒܕܝܐ ܗܘܐ ܒܗ . ܗܘ . ܗܘ ܗܕܡܐ ܒܣܝܒܐ ܡܢ ܠܘܦܐ . ܒܡܫܘܚܬܐ ܕܡܢܐ ܠܟܘܦܪܐ ܠܡܗ . ܗܘܢܐ ܡܠܝܠܬܐ . ܐܝܟܢܐ . ܗܘ ܠܘܬܐ ܐܝܟܢܐ ܒܪܘܢܐ ܡܬܪܘܒܢܐ ܒܘܡܟܐ . ܟܘܫܬܐ ܗܕܡܝܬܐ . ܗܘܢܐ ܒܝܬ ܪܒܬܐ . ܘܡܫܘܚܬܐ ܕܡܢܐ ܒܝܬ ܪܒܬܐ (ܐܣܟܡܐ ١ — ٣) .



ܐܣܟܡܐ (١ — ٢) ܡܬܕܡܝܢܘܬܐ ܕܐܡܝܒܐ

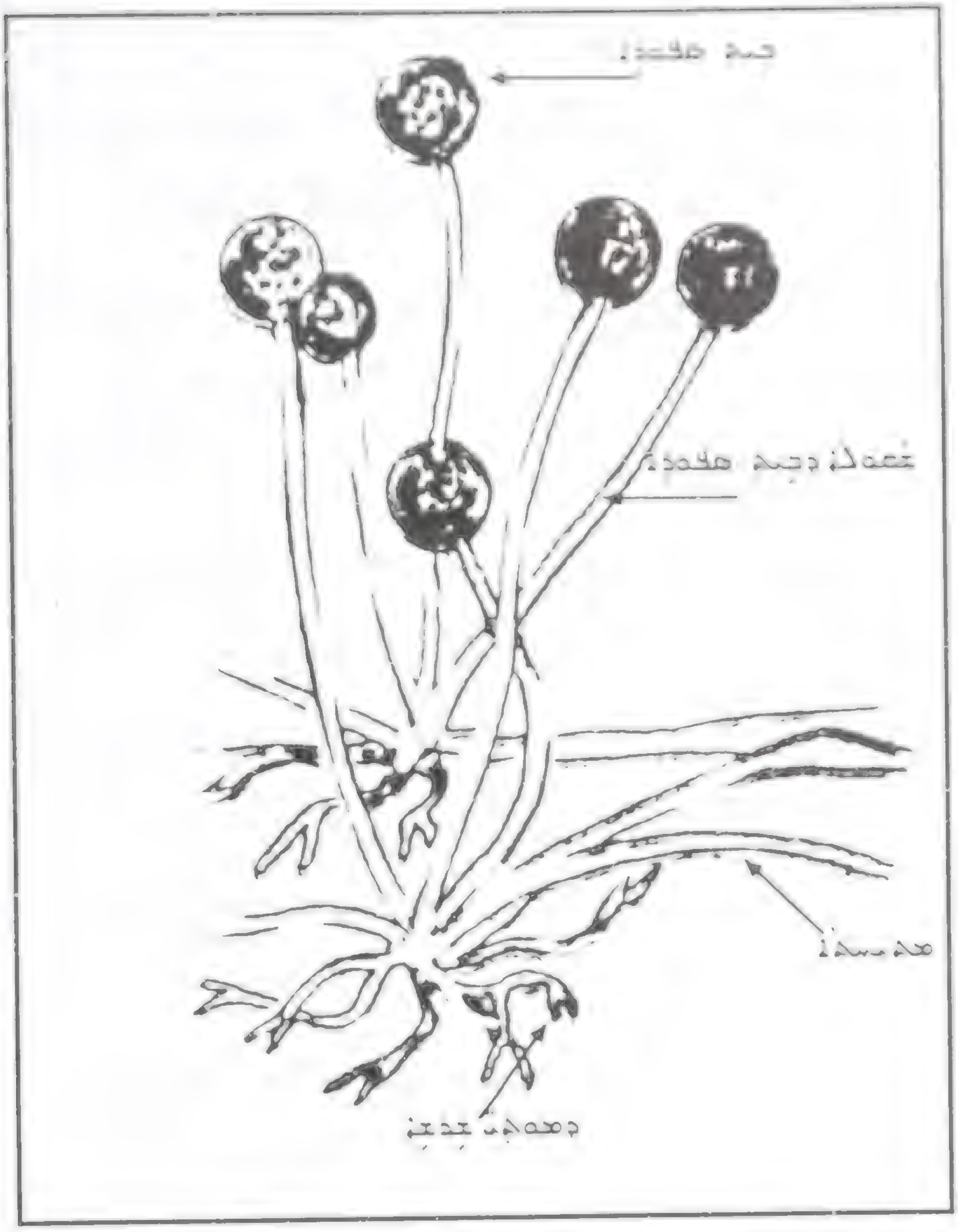
٤ — ٢ ـ ܦܛܪ̈ܝܬܐ (Fungi) :

ܘܡܬܚܫܒܝܢ ܚܢܝܐ ܦܪ̈ܝܫܐ ܒܠܐ ܡܬܪܢܝܢ ܠܡܬܕܒܪܐ ܒܗܕܡ̈ܝܗܘܢ ܒܢܦܫܗܘܢ ܡܛܠ ܐܝܟ ܠܝܬ ܠܗܘܢ ܝܪܘܩܐ (ܟܠܘܪܘܦܝܠ) . ܘܠܐ ܡܨܝܢ ܙܒܘܢܬܐ

ܐܚܪ̈ܢܝܬܐ . ܥܠ ܕܐܘ̈ܐ ܣܢܕܝ ܥܠ ܡܠܘ̈ܐܐ ܡܛܝܒܬܐ . ܐܝܟ ܕܥܡܠܠܗܘ . ܡܢ ܣܘܓܐܐ ܘܢܒ̈ܬܐ ܚܝ̈ܬܐ . ܘܐܝܟ ܝܠܗ ܡܣܬܡܟܢܐ (Parasitic) . ܘܥܠ ܡܠܘ̈ܐܐ ܗܕܡ̈ܝܐ ܬܦܝܢܐ . ܘܗܘܝ ܙܡܝܫܝܐ (Saprophytic) . ܘܡܢ ܛܘܦܣܗ ܦܛܪ̈ܐ ܕܠܚܡܐ ܘܡܣܪܐ ܘܦܛܘܪܝܬܐ ܘܡܪܟܒܗ .

٤ — ٢ — ١ - ܦܛܪ̈ܐ ܕܠܚܡܐ (Bread Mold) :

ܡܬܡܢܐ ܦܛܪ̈ܐ ܕܠܚܡܐ ܠܦܛܪ̈ܝܬܐ ܙܘܓܝܬܐ (Zygomycta) . ܐܝܟ ܕܡܬܘܕܥܐ ܝܠܗ ܠܘܬܡܗ ܡܢ ܚܘܛܐ ܚܘܪܐ ܡܬܪܒܥܐ (Hyphea) ܠܐ ܦܠܝܓܐ ܠܡܘܪܬܐ ܒܗܢܝܢܐ ܡܦܬܚܝ ܦܢܝܬܐ . ܐܝܟ ܕܦܪܥܝ ܠܗܕܡܐ ܡܬܠܝܢ ܡܢ ܚܘܫܒܐ ܢܘܣܝܐ . ܦܪܐ ܦܛܪ̈ܐ ܕܠܚܡܐ ܥܠ ܠܚܡܐ ܪܛܝܒܐ . ܘܡܠܘ̈ܐܐ ܗܕܡ̈ܝܐ ܠܠܒܫܐ ܠܗܘܢ . ܒܕܘܟܝܬܐ ܪܛܝܒܬܐ . ܘܥܠ ܢܪܡܐ ܘܐܪܒܥܐ ܥܠܡܐ . ܟܕ ܐܢܐ ܡܬܪܒܝ ܡܙܠܝܐ ܣܓܝܐܐ ܠܢܠܘܬܐ ܕܚܘܦܪܐ ܕܐܘܐ ܦܛܘܪܐ . ܐܝܬ ܐܡܝܢܝܬ ܠܗ ܗܘܐ . ܘܒܟܪܝܐ ܕܟܪܝܬܐ ܕܡܛܪܐ ܬܦܝܬܐ ܐܘ ܒܪܝܬܐ ܕܚܪܐ ܥܠܠܠܐ ܗܠܝܢܐ . ܣܦܩ ܗܘܐ ܡܢ ܚܘܦܪܐ ܘܐܦ ܡܢ ܬܬܪܢܐ . ܡܬܘܕܥܐ ܢܢܐ ܠܕܪܐ ܦܛܘܪܝܢܐ ܡܢ ܗܝܦܐ ܡܬܪܒܥܐ . ܪܝܒ ܥܠ ܡܠܘ̈ܐܐ ܗܕܡ̈ܝܐ . ܐܝܟ ܕܡܬܪܒܝ ܠܦܛܘܪܝܬܐ ܬܬܘܪܣܝܐ . ܘܦܝܫܐ ܢܢܐ ܡܬܘܡܢܗܐ ܒܪܡܬܐ ܕܚܕܝܬܐ (Substratum) . ܘܗܘܝ ܚܕܡܝܐ ܠܕܪܐ ܕܦܛܘܪܝܬܐ ܦܬܝܐ ܘܐܪܝܟܐ . ܘܪܒܝ ܘܡܬܚܝ ܥܠ ܝܛܝܒܐ . ܘܦܝܫܐ ܢܢܐ ܡܬܘܡܢܗܐ ܬܡܬܚܝܢܐ (Stolons) . ܟܕ ܬܪܝ ܢܝܢܘܗ ܒܡܢܬܐ ܡܢ ܚܘܒܐ ܕܠܕܪܐ ܦܛܘܪܝܢܐ . ܕܡܕܡܝ ܠܡܠܘ̈ܐܐ ܗܕܡ̈ܝܐ . ܗܘ ܕܪܒܝ ܥܠܘܗ ܦܛܘܪܝܬܐ ܘܡܬܪܒܝ ܡܢ ܕܦܝܫܐ ܢܢܐ ܡܬܘܡܢܗܐ ܒܪܡܬܝ ܥܩܪ̈ܐ (Rhizoids) . ܡܬܝܢ ܡܠܘ̈ܐܐ ܗܘܪܫܝܢܐ ܒܡܣܝܒܘܬܐ ܕܡܬܗܝܢܗ ܥܩܪ̈ܐ . ܒܘܪܫܐ ܕܦܪܣܬܐ . ܘܡܛܠ ܐܝܬ ܦܪܝܐ ܡܢ ܗܝܦܐ ܪܒܝ ܥܡܘܕܝܬܐ ܠܥܠ . ܦܝܫܐ ܢܢܐ ܡܬܘܡܢܗܐ ܒܬܡܘܠܐ ܕܒܘܠܒܐ ܕܚܘܦܪܐ . ܡܛܠ ܐܝܟ ܕܡܬܪܒܝ ܬܠܘܗܝ ܚܘܦܪܐ ܥܡܡܐ . ܚܠܝܠܝ ܠܕܘܡܐ . ܒܕܒܪܐ ܬܡܢܘܬܐ ܚܠܘܦܐ ܣܠܝܩܐ ، ܘܐܬܚܘܝ ܠܘܬܐ (ܐܣܝܡܬܐ ١ — ٤) .

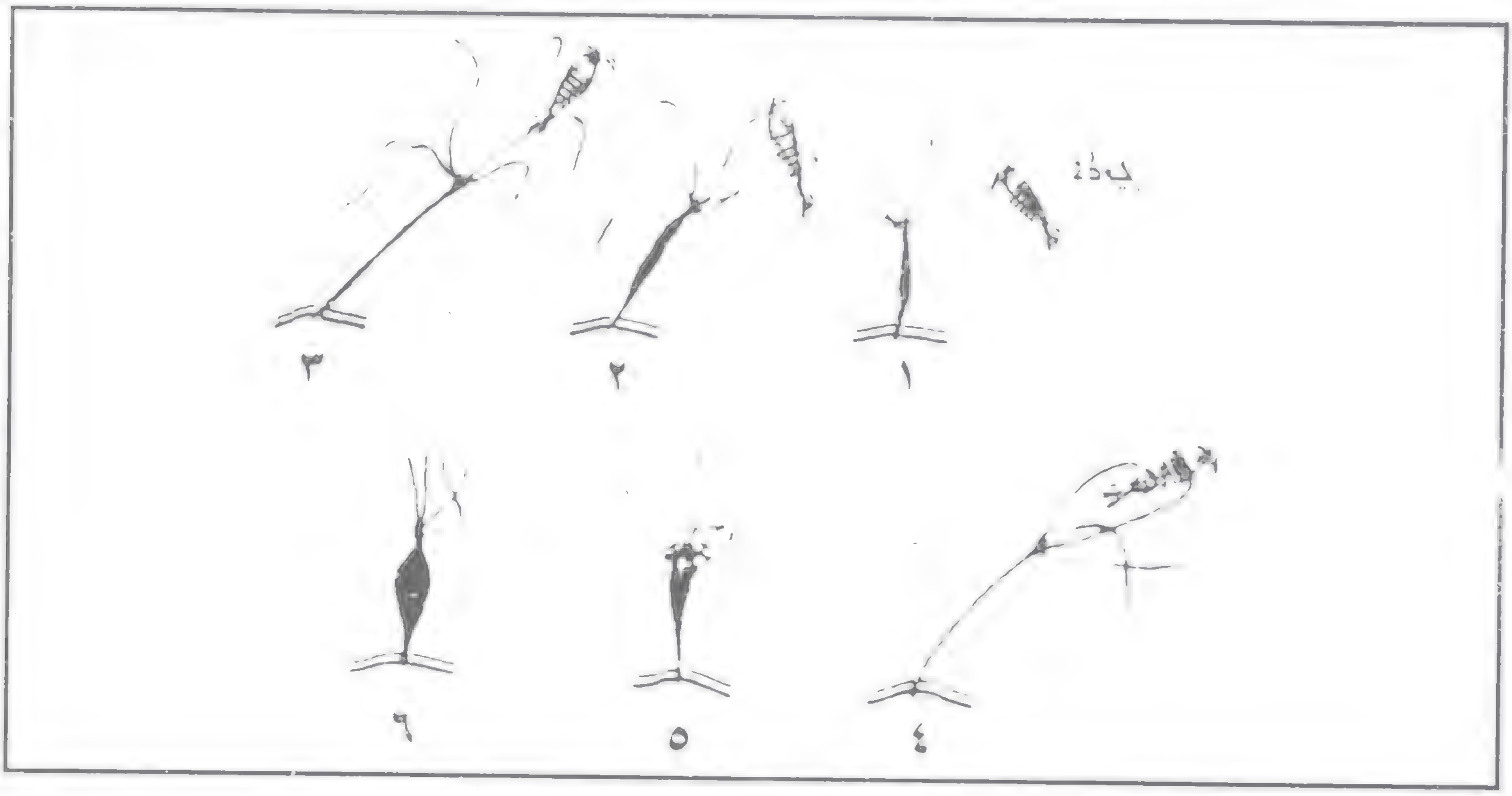


ܨܘܪܬܐ (١ — ٤) ܦܛܪܐ ܕܠܚܡܐ (ܪܝܫܐ ܣܘܪܣܦܘܪܢܐ)

٤ — ٣ - ܗܝܕܪܐ (Hydra) :

ܗܝ ܚܕܐ ܚܝܘܬܐ ܙܥܘܪܬܐ . ܐܘܪܟܘܬܗ ܒܝܢ ٢ - ١٠ ܡܡ . ܘܗܝܕܪܐ ܚܕܟܡܐ ܡܠܝܟܬܐ . ܡܬܝܚܣܐ ܠܫܘܪܒܬܐ ܕ (ܢܘܨܝܢܝܬܐ) (Cnidaria Coelenturata) . ܐܝܟ ܕܚܝܘܬܐ ܡܝܢܝܬܐ (ܗܝܕܪܘܙܘܐ) (Hydrozoa . ܘܡܬܝܕܥܐ ܗܝ ܒܡܬܦܫܛܢܘܬܗ ܠܣܘܪܐ ܕܦܘܠܦܐ (ܛܘܪܐ ܠܐ ܝܕܝܥܐ ܠܗ ܢܘܨܝܢܝܬܐ) ܒܠܚܘܕ . ܘܡܫܟܚܐ ܗܝ ܚܝܘܬܗ ܠܗ ܒܪܝܫܝܬܐ ܘܡܘܪܟܒܐ ܘܡܢܐ ܚܠܝܐ ܡܪܝܪܐ : ܒܗ ܕܒܝܬܐ ܡܢ ܐܝܬܗ ܟܠ ܚܕܟܡܐ ܢܟܝܬܐ ܡܝܢܝܬܐ) .

ܡܫܬܘܬܐ ܗܕܝܐ ܥܠ ܚܕܐ ܘܥܒܕܐ ܡܓܘܪܬܐ ܪܒܬܐ. ܐܝܟ ܛܥܝܢܬܐ
ܡܠܦܢܘܬܐ ܘܪܚܘܩܬܐ ܕܚܕܩܬܐ ܪܚܝܬܐ. ܘܪܕܡܐ ܚܕܩܬܐ ܠܗܘ ܐܝܘܪܐ ܒܝܢ
ܠܒܘܪܐ ܡܢ ܠܗܡܢܘ. ܘܡܣܘܚܬܐ ܕܡܘܪܬܐ ܢܘܡܝܢܬܐ ܕܐܝܟ ܟܡܢܬܢܝܬܐ
ܟܪܟܘܬܐ. ܡܢܝܢܐ ܕܡܬܥܒܠܝܢ ܠܘܬܐ ܕܓܘܪܗ. ܚܕܐ ܗܟܢ ܪܘܚ ܦܘܡܗ.
ܘܚܪܢܐ ܡܬܚܪܬܐ ܕܡܘܪܬܐ ܠܓܘ ܚܠܠܘܬܐ ܐܬܩܪܝܬ ܡܢܝܢܐ.
Gastro – Vascular Cavity ܟܡܝܢܘܬܐ ܕܟܪܣܐ (ܡܥܝܢܝܐ)



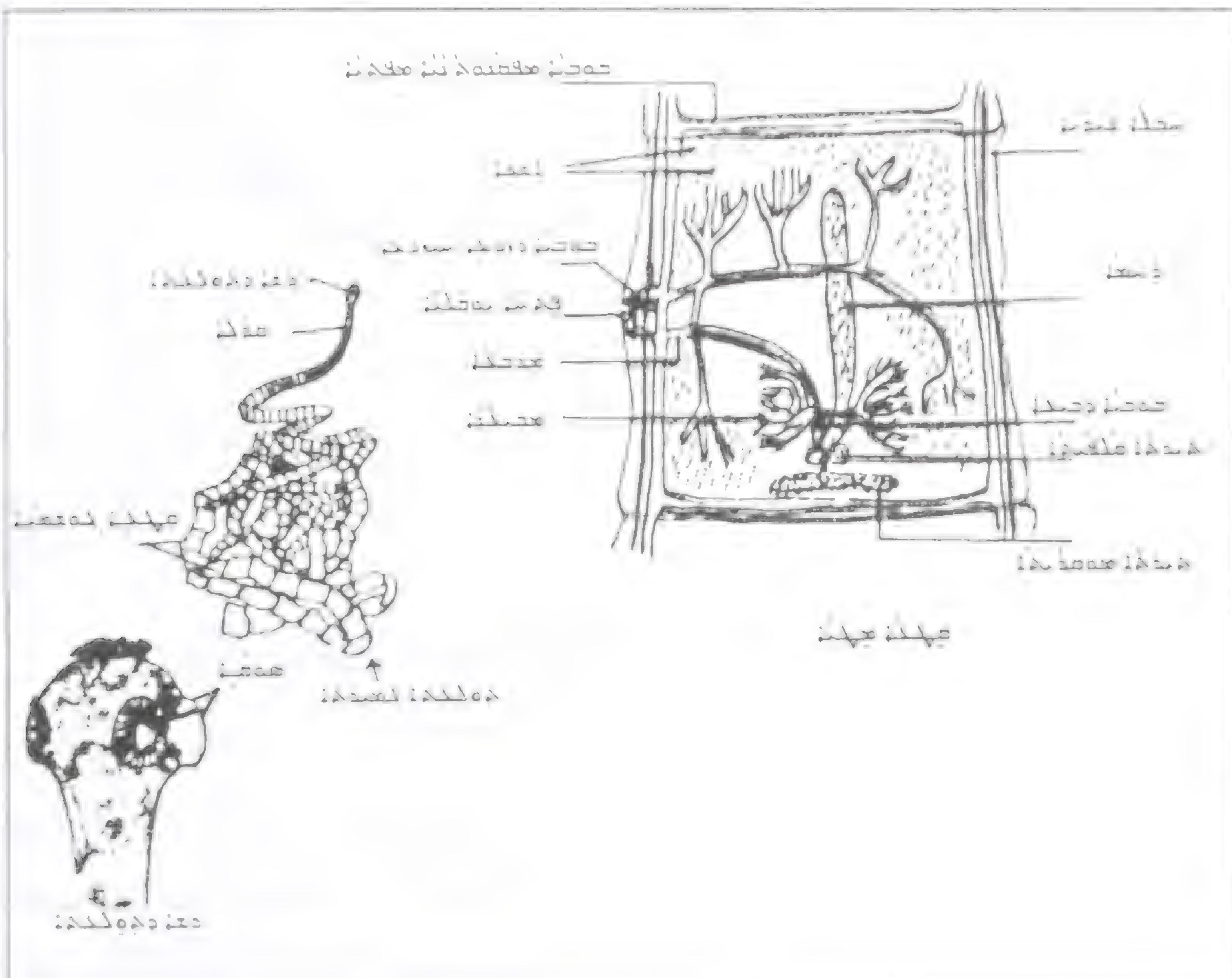
ܐܨܛܠܐ (١ – ٦) ܡܫܬܘܬܐ ܕܗܝܕܪܐ

٤ – ٤ – ܬܘܠܥܬܐ ܦܠܛܬܐ (Tapeworm):

ܡܢܝܐ ܬܘܠܥܬܐ ܦܠܛܬܐ ܒܟܠܗ ܐܕܫܐ ܗܠܝܢ. ܐܝܟ ܒܡܪܢܝܬܐ
Taenia Saginata ܘܚܘܪܢܐ (T. Solium) ܘܡܬܪܒܝܢ ܡܢ ܐܕܫܐ.
ܠܦܘܚܬܐ ܕܬܘܠܥܬܐ ܡܬܦܫܛܬܐ (Platyhe Lminthos). ܚܘܝܢܝܬܐ
ܠܗ ܐܘ ܬܘܠܥܬܐ ܡܚܕܡܢܝܬܐ ܢܦܫܝܬ ܥܠ ܦܓܪܐ ܘܚܕܩܬܐ
ܚܠܝܢܬܐ ܐܚܪܢܬܐ. ܘܡܢܝܢܐ ܡܢܗ ܚܕܩܬܐ ܝܡܝܢܐ ܚܘܠܡܢܝܐ. ܡܛܠ
ܗܘ ܡܬܘܦܩܐ ܒܗܘ ܒܬܘܪܬܐ.
ܘܦܢܝܢ ܬܘܠܥܬܐ ܦܠܛܬܐ ܠܒܪ ܐܕܫܐ ܡܢ ܚܕܐ ܠܡܡܠܠܬܐ
ܕܒܘܪܬܐ ܕܚܘܬܗ. ܦܓܪܐ ܠܗ ܡܬܘܡܝܐ ܡܕܡܝܐ ܟܡܬܠܝܬܐ ܐܡܝܢܐ (
ܐܝܟ ܒܪܢܫܐ ܡܢ ܠܘܦܐ). ܘܚܝܐ ܬܘܠܥܬܐ ܡܛܠܬܐ. ܡܗܡܡܝܢܬܐ

ܥܠܗ ܠܐ ܡܨܝܐ ܕܢܣܒܐ · ܘܦܪܢܣܐ ܠܗ ܡܢ ܡܫܘܡܫܐ ܕܐܚܪ̈ܢܐ · ܒܡܫܡܠܝܐ ܝܕܥ̈ܢܐ (ܐܝܟ ܒܣܪܐ ܘܚܘܒܪܐ) · ܘܚܢܢ ܠܗܘ ܕܫܡܗܝܢ ܕܦܘܛܪ̈ܝܬܐ ܡܬܒܥ̈ܝܢ ܠܗ ܒܡܫܪܝܘܬܗ ܙܒ̈ܢܝܬܐ.

ܘܒܟܕܢܐ ܕܕܪ̈ܓܬܐ ܕܚܕ ܦܘܩܐ ܫܢܐ ܡܢܗ ܟܢܘܫ ܡܬܘܪܒܝܢܐ · ܘܟܕ ܡܬܡܠܐ ܒܙܘܥ̈ܐ · ܚܢܘܢ ܕܦܘܛܪ̈ܝܬܐ ܘܦܛܪ̈ܝܬܐ · ܡܬܬܠܡ ܠܦܘܩܐ ܘܥܒܕܐ ܕܦܘܪܫܐ ܡܬܟܢܫܝܢ ܒܦܚܕܐ · ܐܝܟܢܐ ܗܟܢ ܠܫܝܬܐ ܕܐܘܪܝܬܐ ܕܦܘܩܣܘܬܐ · ܕܐܘܪܝܬܐ ܠܙܒ̈ܢܐ ܒܢܦܫܗ · ܐܦ ܡܫܟܚܐ ܠܗ ܫܘܚܐ ܕܦܘܪܫܐ ܢܦܠܐ ܒܡܫܪܘܬܐ · ܠܗ ܡܬܟܢܐ ܠܦܘܩܐ ܡܬܚܐ (ܐܨܘܪܬܐ — ٦).



ܐܨܘܪܬܐ (١ — ٦) ܦܘܛܪ̈ܝܬܐ ܘܦܛܪ̈ܝܬܐ

ܥܠܬܐ ܕܠܒܫܘܬܐ ܕܐܘܪܝܬܐ · ܕܦܬܪܐ ܠܗ ܦܘܛܪ̈ܝܬܐ · ܕܒܟܕ ܠܦܘܩܬܐ ܡܬܡܫܚܬܐ · ܫܦܪܐ ܩܕܡ ܟܠܡܫܟܚܬܐ ܕܡܘܪ̈ܫܐ ܡܦܘܩܕܐ ܡܢ ܡܟܪܢܐ ܡܬܒܝܢܐ ܡܫܕܪܢܝܬܐ · ܟܕ ܗܕܐ ܡܦܠܓܐ ܥܠ ܚܘܕܬܐ ܕܠܦܘܩܐ ܘܗܕܡܝܗ

ܡܬܝܠܦܐ ܒܡܠܘܪܘܬܐ ܕܦܪܘܫܬܐ . ܘܐܝܬ ܠܪܘܫܬܐ ܐܠܘ . ܕܡܬܩܘܠܬܗ
ܗܦܝܟܬܐ ܐܠܐ ܡܢ ܢܬܝܪܘܬܐ ܙܘܥܬܐ .

ܕ ـ ܗ ـ ܒܩܐ (Mosjuitoes) :

ܡܢܝܢܐ ܒܩܐ ܠܫܘܪܒܬܐ ܕܥܩܒܬܢܝܬܐ (Arthropoda) . ܐܪܒܥܐ ܕܪܓܠܐ (Insecta) . ܘܠܡܫܦܚܘܬܐ ܕܬܪܬܝܢ ܓܦܝܢ (Deptera) . ܘܗܘ ܐܝܬܘ ܡܢ ܪܚܫܐ ܐܝܢܝܢ ܕܚܙܝܢ ܡܬܩܛܠܢܝܬܐ ܥܠ ܐܢܫܐ ܡܢ ܚܝܘܬܐ . ܒܠܥܝܣܬܐ ܕܕܡܐ ܒܡܫܪܝܘܬܐ ܕܟܘܪܗܢܐ ܕܦܘܡܗܘܢ . ܡܢܗܘܢ ܡܬܚܒܠܝܢ ܠܗܘܢ ܦܓܠܐ ܡܢ ܡܪܥܝܘܬܐ . ܘܡܬܚܙܝܢ ܗܢܐ ܠܗܘܢ ܚܕܟܡܐ ܡܪܥܐ ܡܫܬܠܚܐ .

ܘܦܪܐ ܐܝܬܘܬܐ ܕܒܩܐ ܠܗ ܦܢܝܬܐ ܡܪܘܚܬܐ . ܘܡܘܪܒܐ ܕܐܡܝܢܐ ܘܡܢܝܢܐ . ܘܡܚܝܠ ܢܦܫܐ ܡܬܟܢܐ ܒܟܠܗ ܠܗ ܡܢܐ . ܘܡܬܒܥܠܐ ܪܚܫܬܐ ܡܬܩܠܐ ܒܬܘܠܦܐ ܨܘܪܬܐ Metamor Phosis ܠܦܘܬ . ܒܪܐ ܗܘܐ ܒܥܘܠܝܬܐ . ܒܪܐ ܕܦܓܪܐ ܒܩܐ ܠܡܢܝܬܐ .

ܐܝܬ ܗܠܝܢ ܐܪܒܥ ܙܢܝܢ ܡܢ ܒܩܐ . ܡܬܒܪܝܢ ܒܟܪܗܢܐ ܕܟܪܝܗܐ ܡܪܥܐ ܘܐܝܠܝܢ :

ܐ . ܐܢܘܦܝܠܝܣ Anopheles ܘܡܥܒܪܐ ܡܠܪܝܐ ܕܟܘܪܗܢܐ ܡܕܡܐ ܘܡܫܘܪܝܐ .

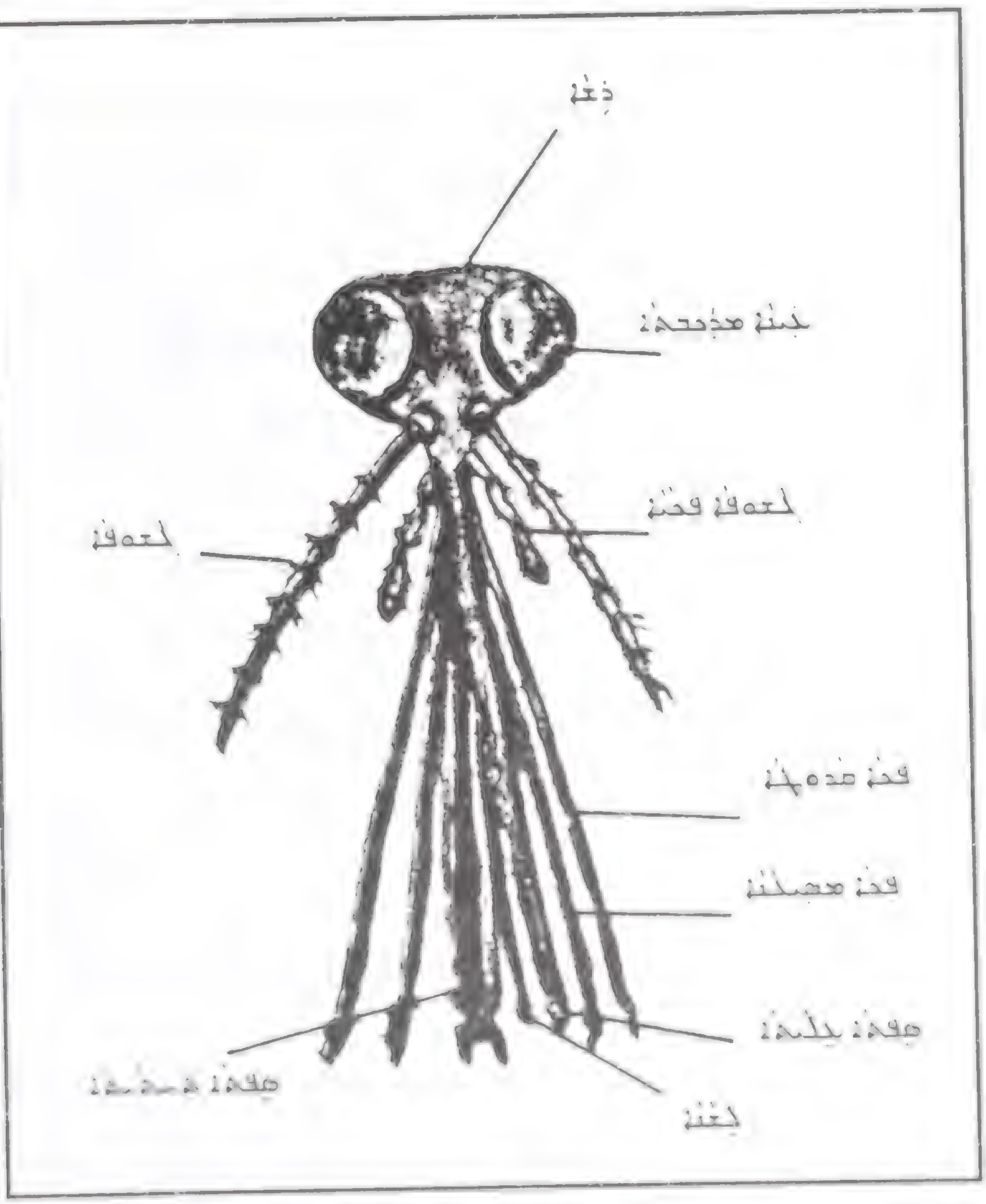
ܒ . ܟܘܠܝܟܣ ܘܡܥܒܪܐ ܡܠܪܝܐ ܕܦܝܠܐ ܒܢܝܐܐ .

ܓ . ܐܝܕܝܣ Aedes ܘܡܥܒܪܐ ܐܫܬܐ ܕܕܢܓܝܘܬܐ Dengue Feven .
ܘܐܫܬܐ ܚܪܘܟܬܐ Yellow Fever ܗܢܘ ܟܪܝܗܐ .

ܦܘܫ ܘܚܘܝ ܠܗܢܐ ܕܣܪܛܘܦ :
ܦܠܘܓ ܬܠܡܝܕܐ ܠܡܫܚܐ ܠܗ ܡܚܬܒܐ ܕܐܘܣܪܛܘܬܐ . ܥܠ ܦܢܝܬܐ ܕܪܚܫܐ ܡܢܟܝܬܐ . ܘܡܚܘܬ ܟܪܝܗܐ ܒܪܐܐ ܡܢ ܡܥܝܪܢܘܬܐ ܠܦܢܝܬܐ ܕܪܚܫܐ ܡܢܟܝܬܐ .
ܡܢ ܐܝܠܝܢ ܠܪܘܦ ܒܗܘܐ ܦܘܠܚܢܐ ؟ ܡܛܠ ܐܝܠܝܢ ܒܘܠܦܢܘܬܐ .

ܡܬܬܚܐ ܕܒܪܐ ܥܠ ܗܢܐ ܕܠܡܫܬܠܘ ܡܢ ܥܒܪܐ ܕܝܢܐܬܐ. ܣܟܝܢܐ ܥܠ ܚܕ ܡܬܬܚܝܢ ܣܟܝܢܐ ܗܢܐ ܠܗ. ܘܗܘ ܗܕܡܐ ܕܦܘܡܐ ܠܡܫܝܐ ܒܠܚܘܕ. ܐܢܐ ܢܩܒܬܐ ܗܘ ܗܕܡܐ ܕܦܘܡܐ ܟܘܠܗ ܠܡܫܝܐ. ܨܘܪܬܐ (١ — ٧) ܘܡܫܝܐ ܕܟܘܠܗ ܥܠܬܐ ܕܡܫܬܠܝܐ. ܘܠܡܫܝܐ ܕܗܘ ܟܕ ܕܠܝܢܘܬܐ ܡܬܢܝܚܬܐ. ܘܡܫܬܠܝܢܘܬܐ ܕܦܘܡܐ ܕܡܫܬܡܫܘܬܐ ܕܟܠܗܘܢ ܡܬܚܙܝܐ ܠܐܘܢ ܦܘܠܚܢܐ. ܘܡܬܦܫܐ ܐܝܟܐ ܟܕܒܪܐ ܕܡܬܥܒܪܢܘܬܐ ܕܐܘܐ ܡܬܬܚܝܢܘܬܐ ܟܕ ܗܘܐ ܣܟܝܢܐ ܥܠ ܚܕ ܡܠܘܐܐ ܕܡܟܠܢܐ ܠܡܫܝܢܐ ܕܦܘܡܐ ܟܕܒܪܢܐ ܕܠܡܫܝܗ. ܘܟܠܗܘܢ ܗܘܐ ܐܝܟܐ ܣܟܝܢܐ ܥܠ ܡܬܡܫܚܢܘܬܐ. ܐܘ ܡܘܕܡܐ ܘܠܦܐ ܟܕܢܝܐ ܐܘ ܚܘܐ ܟܡܐܟܐ.

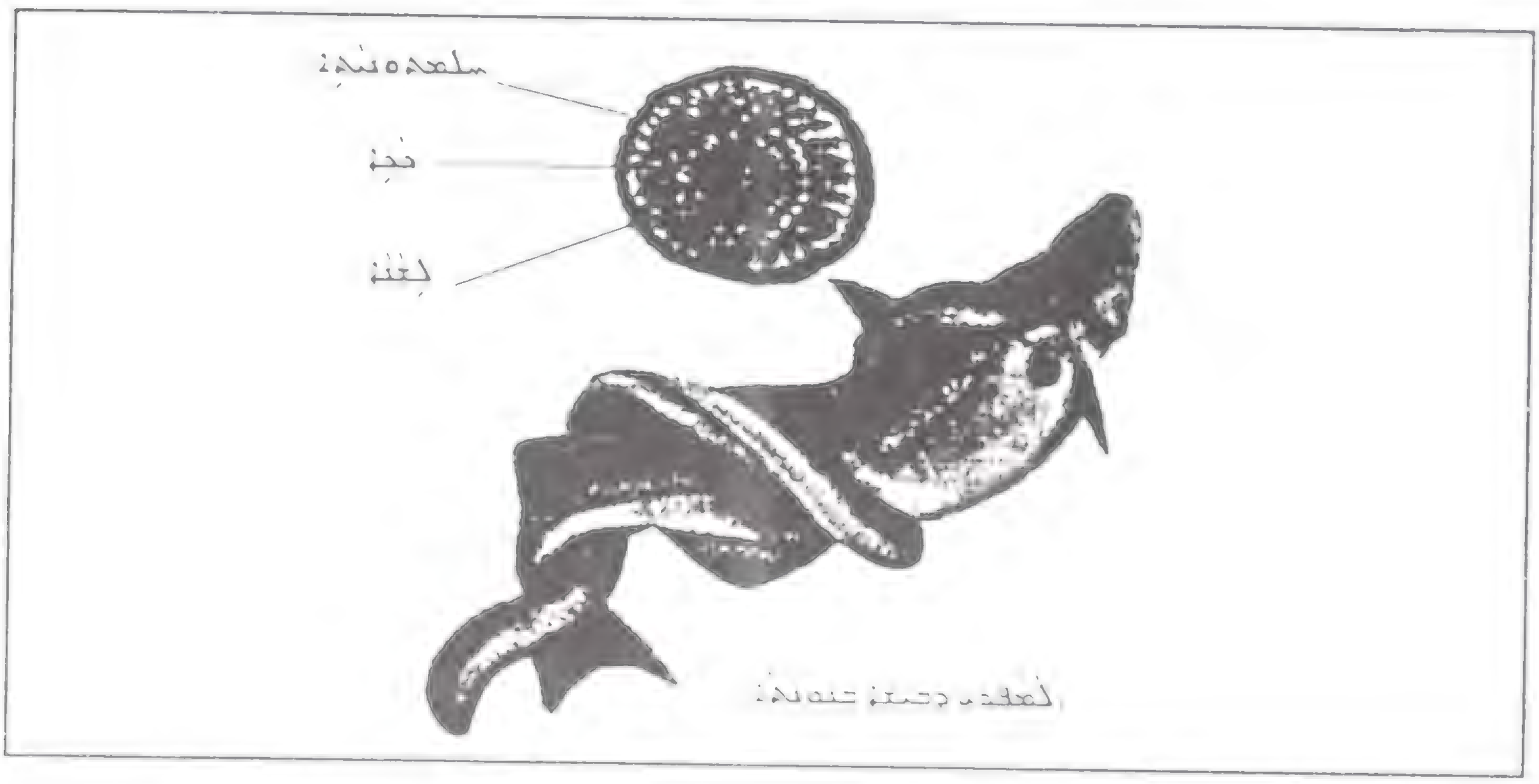
ܐܝܟ ܕܦܘܡܐ ܡܢ ܟܕ ܠܡܫܝܗ ܠܐܫܬܘܡܐ. ܘܟܕܝܢܐ ܦܟܪܗ ܐܟܪܐ. ܘܡܫܝܐ ܢܩܒܬܐ ܕܡܬܬܚܐ ܥܠ ܥܒܪܐ ܕܝܢܐܬܐ ܐܝܟ ܕܒܪܐ ܠܡܫܬܐܝܬ. ܐܝܟܢܐ ܗܝ ܡܫܚܢܐ ܠܦܘܡܐ ܡܫܠܠ ܘܗܘܐ ܥܠ ܐܒܪܐ ܟܡܠܘܐܐ ܦܪܘܬܝܢܐ. ܠܡܬܪܨܬܐ ܕܒܚܢܐ ܡܫܠܝܐ. ܘܦܪܬܝܬ ܟܘܒܢܐ ܕܦܪܢܘܬܐ.



ܨܘܪܬܐ (١ — ٧) ܡܢܘܬܐ ܕܦܘܡܐ ܕܒܩܬܐ ܕܟܡܐܐ

٤ ـ ٦ ـ ܚܝܘܬܐ ܦܩܪܬܢܝܬܐ (Vertebrate Animals) :

ܕܠܐ ܝܒܘܫܬܐ . ܐܘܪܚܐ ܕܝܘܠܦܢܐ ܕܗܘܕܥܬܐ ܠܗ ܚܝܘܬܐ ܦܩܪܬܢܝܬܐ . ܦܪܝܫܐ ܡܢܐ ܦܘܪܫܢܐ ܓܠܝܐ . ܡܢ ܚܠܬܐ ܕܒܘܣܠܡܐ ܐܝܟ ܕܐܝܬ ܒܝܢ ܐܪܒܥܘ ܡܢܣܠܡܐ . ܡܢ ܓܢܣܐ ܕܪܘܒܒܐ ܕܓܘܢܓܝܗ . ܘܐܘܪܚܐ ܕܚܝܘܬܗ . ܒܝܕ ܚܘܣ ܡܢ ܓܘܫܡܐ ܕܚܝܘܬܐ ܕܠܡܦܪܝ ܝܡܡܐ Sea Lamprey (ܨܘܪܬܐ ٤ ـ ٨) . ܐܝܬܠܗ ܚܕ ܦܘܡܐ ܢܩܝܠܐ ܒܒܘܡܡܐ ܦܬܝܚܐ . ܘܫܪܝܪܐ ܒܚܕ ܡܢܝܢܐ ܡܢ ܚܠܡܘܢܝܬܐ . ܘܚܕܟܡܐ ܟܒܐ ܙܘܥܐ . ܘܡܟܝܢ ܡܢ ܡܙܓܠܗ ܚܕ ܠܫܢܐ ܡܬܡܘܝܠܢܐ . ܠܓܢܝܐ ܐܦ ܟܒܐ ܙܘܥܐ . ܡܦܠܣܠܘܦ . ܒܥܕܡܬܐ ܕܓܠܕܐ ܕܢܘܢܐ . ܐܝܟ ܕܦܪܫܝܢ ܚܠܘ . ܒܡܫܚܝܘܬܐ ܕܒܘܡܪܢܝܬܐ ܕܚܠܘܒܗܐ ܡܬܡܕܝܠܢܝܬܐ . ܘܡܝܬ ܦܘܡܐ ܒܠܡܙܓܐ ܕܝܣܠܐ ܕܓܘܡܡܐ ܕܡܡܒܠܢܐ (ܢܘܢܐ) ܘܕܡܗ . ܘܗܡܐ ܐܝܬ ܗܝܕܝܬܐ ܕܕܢܝܬܐ ܡܢܣܠܡܐ . ܕܡܟܠܝ ܕܦܬܚܝܗ ܠܡܘܬܐ ܕܕܡܐ ܕܡܡܒܠܢܐ .



ܨܘܪܬܐ (٤ ـ ٨) ܠܡܦܪܝ ܝܡܡܝܐ
(ܦܘܡܐ ܒܒܘܡܡܐ ܕܚܕ ܡܘܡܬܐ ܦܬܝܚܐ)

ܐܝܬܐ ܐ . ܟܠܒ ܐܝܟܢܘܬܐ ܕܡܬܕܡܝܢܘܬܐ ܒܟܠܒܐ ܕܝܡܐ ܒܘܟܢܐ (Sjualus Acanthias . ܐܝܟ ܒܚܘܣ ܕܦܘܡܗ ܠܒܘܪܐ ܝܠܗ ܒܪܫܐ ܕܘܟܐ ܨܘܪܬܐ (٤ ـ ٩) . ܘܗܘ ܡܘܪܐ ܝܠܗ ܒܟܒܐ ܚܪܝܦܐ ܘܪܒܐ . ܡܢܐ ܒܝܕܗ

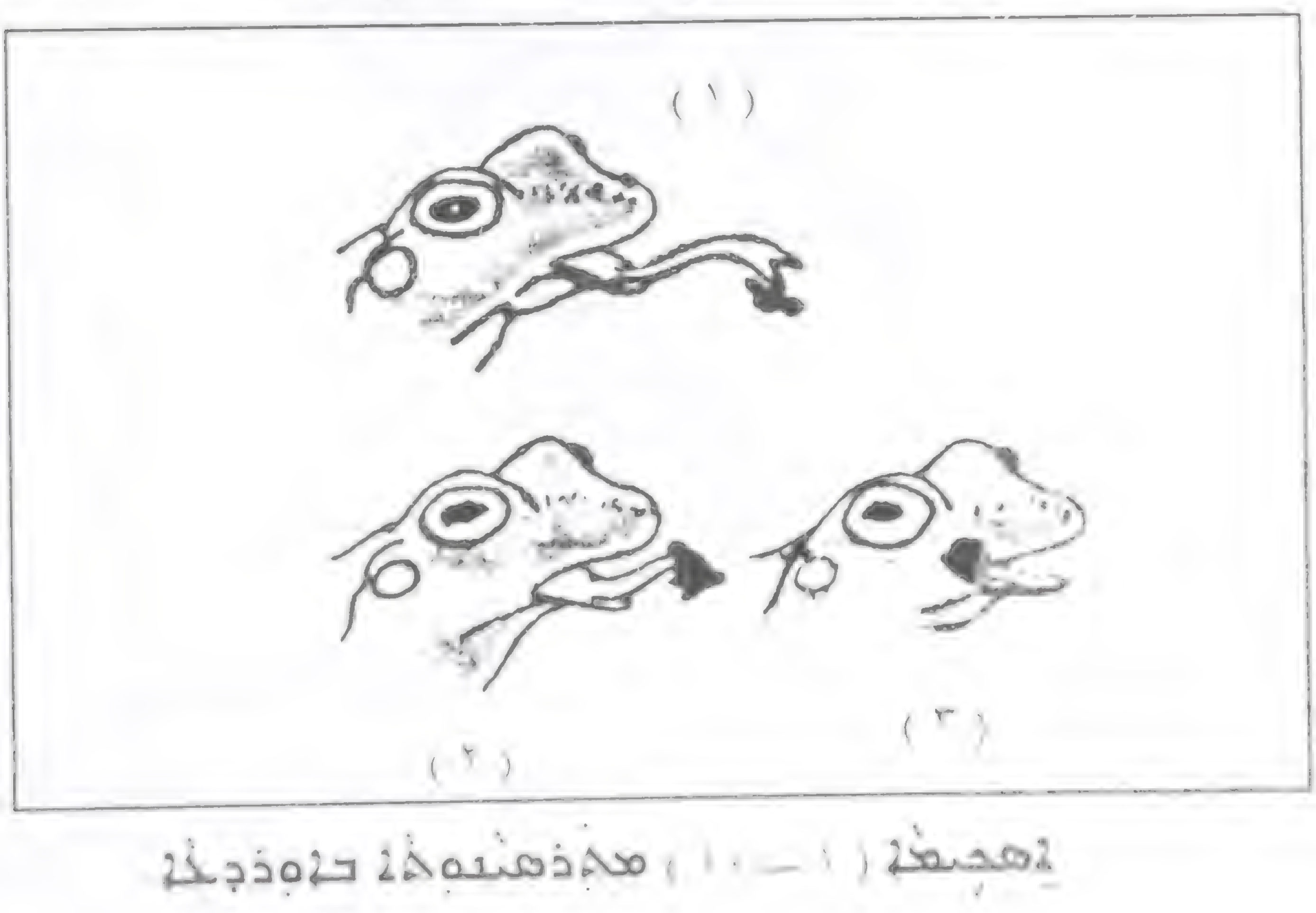
ܡܪܟܒܬܐ ܕܓܘܪܗ̇ . ܘܫܠܝܚܘܗ̇ ܒܫܠܝܚܘܬܐ . ܘܦܬܝܚܐ ܝܬܝܪ ܡܢ ܓܪܒܐ ܒܪܝܫܗ̇ . ܒܐܘܪܚܐ ܕܫܘܠܛܐ ܕܐܘܪܓܢܐ . ܘܡܬܝܚܐ ܟܠܗܝܢ ܝܘܢܐ ܒܫܠܝܚܘܬܗ̇ . ܘܡܬܝܚܐ ܡܢ ܕܡܬܪܡܐ ܥܠ ܐܪܒܥܐ ܩܛܝܢܐ ܘܩܛܝܢܐ ܒܡܨܥܬܐ ܕܟܘܪܐ .



ܨܘܪܬܐ (١ — ٩) ܓܠܕܐ ܕܢܘܢܐ ܟܘܒܢܝܐ

ܗ̇ܘ ܕܟܠܐ ܕܫܘܒܩܐ ܕܝܘܢܐ . ܗ̇ܝ ܕܥܒܕܐ ܠܐܘܪܓܢܗ̇ . ܡܢ ܡܘܪܟܐ ܕܥܒܝܐ ܕܡܝܐ . ܠܝܬ ܝܠܠ ܝܘܕܥܐ . ܘܝܘܢܐ ܗ̇ܝ ܕܥܒܕܐ ܠܐܘܪܓܢܗ̇ ܡܢ ܝܒܫܐ ܩܫܝܐ . ܠܝܬ ܐܠܐ ܒܝܘܪܬܐ ܠܘܩܕܐ .

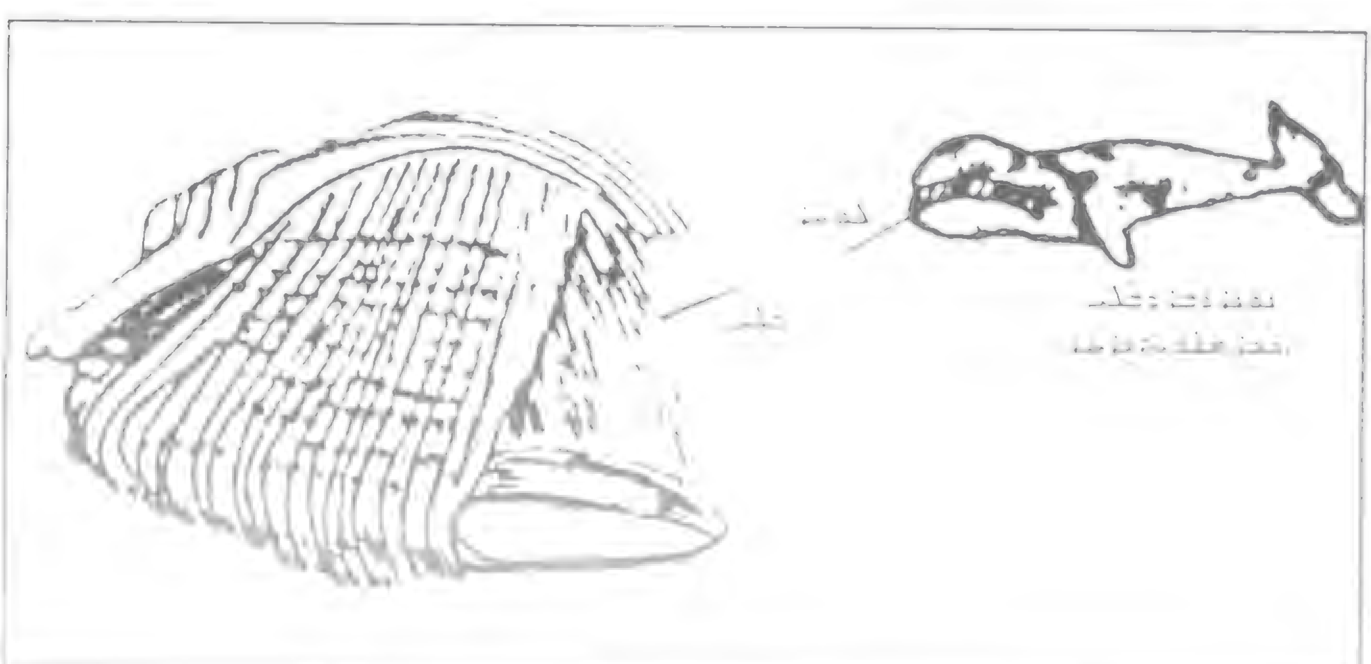
ܘܡܩܠܣ ܐܘܪܟܐ ܠܫܢܗ ܒܪܒܝܬܐ ܕܩܫܝܐ . ܒܪܫܗ ܥܠ ܓܘܪܗ ܒܫܠܘܠܬܐ . ܘܪܝܒ ܒܝܗ ܒܡܫܚܠܦܘܬܐ ܕܪܡܬܐ . ܘܪܝܒ ܠܫܢܐ ܒܝܘܪܬܐ ܠܩܘܒܠܐ . ܡܢ ܕܡܛܝܐ ܩܫܝܬܐ ܡܢ ܦܪܡܬܐ . ܨܘܪܬܐ (١ — ١٠) .



ܨܘܪܬܐ (١ — ١٠) ܡܬܪܨܝܢܘܬܐ ܒܥܘܪܕܥܐ

ܐܝܬ ܒܪܥܘܦܐ . ܡܘܚܠܐ ܦܪܝܫܐ ܠܗ ܠܗ ܚܘܫܬܐ . ܐܝܟ ܡܫܠܛܘ ܗܝ ܕܡܬܪܡܝܐ ܠܐܘܪܒܐ . ܒܐܘܪܚܐ ܕܡܫܠܡܐ ܕܡܘܪܦܝܗ . ܡܥܦܠܝܬܐ ܕܠܒܢܐ . ܚܠܒܐ ܚܘܦܐ ܘܡܬܦܚܝܢ ܒܪܘܚܗ . ܕܠܐ ܠܢܫܡܬܗ . ܐܦ ܕܐܝܬܠܗܘܢ ܪܒܐ ܣܪܝܩܐ . ܦܬܝ ܡܥܦܠܝܢ ܡܫܠܛܬܐ ܕܒܗܪܐ ܡܢ ܦܪܨܘܦܐ . ܠܝܬ ܪܒܐ ܠܗ ܩܠܘܦܬܐ . ܐܠܐ ܦܝܪܐ ܗܢܐ ܙܘܥܐ ܦܝܘ ܚܣܪܐ ܐܘܪܚܐ . ܕܡܢܗܝܢ ܒܗ ܫܠܡܐ ܕܡܘܪܦܝܗ ܢܘܪܢܝܢܐ . ܘܦܪܝܫܐ ܗܢܐ ܐܫܡܬܐ ܕܢܡܪܘܬܐ ܠܗ ܓܪܒܐ . ܠܘܩܒܠ ܐܘܪܚܐ ܕܫܠܡܐ ܕܡܘܪܦܐ . ܘܡܢܗ ܐܝܬ ܢܡܪܐ ܪܒܝܐ . ܠܫܠܡܐ ܕܦܪܓܐ ܘܪܚܝܐ ܘܡܘܠܕܐ . ܘܡܢܗ ܐܪܒܐ ܡܬܒܝܢܐ ܡܢ ܠܩܘܒܠܐ ܕܢܘܢܐ ܘܠܗܘܢܐ . ܘܪܚܘܩܐ ܡܢ ܡܪܘܬܐ . ܘܡܛܠ ܐܦ ܐܝܬ ܢܡܪܘܬܐ ܦܬܝܐ . ܠܝܡܬܐ ܕܢܘܢܐ . ܘܢܡܪܘܬܐ ܣܪܝܩܐ ܪܦܝܐ ܠܩܘܒܠܐ ܕܒܗܪܐ . ܘܡܕܡܬܐ ܕܟܫܪܝܗ .

ܙܢܝ ܢܘܢܐ ܪܒܐ ܕܕܘܠܦܝܢܐ (Dolphin) ܢܘܢܐ . ܘܚܕܐ ܡܬܐܡܪܝܢܐ ܗܢܐ ܘܢܘܢܐ ܪܒܐ ܕܒܠܝܢ (Balaena) ܒܠܝܢ ܪܒܐ ܗܠܝܢ . ܘܦܘܡܗ ܡܚܘܪܐ ܗܠܝܢ . ܕܦܚܝܬܐ ܪܡܝܬܐ ܫܩܘܠܬܐ ܢܘܗܪܐ . ܣܓܝܐܝܢ ܚܕ ܡܢ ܩܢܝܢܐ ܡܢ ܚܘܬܐ ܘܠܘܪܬܐ . ܐܝܟ ܕܡܬܚܙܝܢ ܠܗ ܦܘܡܗ ܟܕ ܡܢܐ . ܘܟܠܗ ܪܦܬܐ ܕܡܢܐ ܠܪܒܐ . ܒܗ ܬܠܬܠܘܦ . ܐܫܟܠܐ (١ — ١١) .



ܐܫܟܠܐ ( ) ܢܘܢܐ ܪܒܐ ܕܒܠܝܢ

ܘܐܝܬܠܗ ܣܘܓܐܐ ܣܓܝ ܕܟܠܗܝܢ ܚܠܒܐ . ܒܗ ܡܦܠܚܝܢܠܗ ܒܥܒܕܬܐ ܕܓܒܬܐ .
ܘܡܬܡܨܝܢܘܬܐ ܥܠ ܥܩܪܐ . ܐܦ ܕܗܘ ܡܬܕܪܫ ܥܠ ܒܣܪܐ . ܐܝ . ܦܪܐܠܗ
ܡܠܐܗ ܦܘܪܫܐ . ܐܝܟ ܠܘܡܠܐ ܡܦܠܚ ܐܪܥܐ ܗܦܘܟܗ ܒܐܓܠܬܐ ܕܒܘܥܐ
ܘܥܒܕܐ ܐܝܟ ܕܫܪܐ ܥܠܝܗ . ܘܦܠܐ ܐܝܬܠܗ ܣܪܝܩܘܬܐ ܗܘ ܝܠܗ
ܡܡܪܢܝܬܐ ܒܗܘܠܦܐ ܕܢܫܪܐ . ܘܗܦܟܐ ܚܠܬܐ ܒܐܪܥܐ ܡܪܘܢܐ ܕܛܘܒܬܐ .
ܡܬܚܠܐ ܒܢܘ ܗܘܪܫܢܐ ܘܡܢܐ ܠܦܘܡܗ . ܐܚܪܢܐ ܗܪܘܫܬܐ ܒܡܘܪܬܐ
ܠܗܢܬܐ . ܣܪܒܡܐ ܣܘܐܬܐ . ܒܪ ܢܦܫ ܥܠܝܗ ܒܢܝܢܐ ܘܢܝܪܐ . ܬܪܝܢ ܗܘܝܢ
ܐܠܐ ܒܗܪܝܗ ܒܝܢ ܒܚܝܗ ܣܪܝܩܐ ܘܢܩܝܕܐ . ܡܬܘܡܝܢܐ ܠܐܗܐ ܐܪܥܐ
ܕܡܐܬܘܠܬܐ . ܘܡܪܡܪܐ ܗܘܦܐ ܠܚܕܪܢܐ ܒܐܘܪܚܐ ܕܥܡܠܗ ܠܗܘܪܫܢܐ . ܒܪ
ܡܦܠܚ ܐܪܥܐ ܐܝܪܘ ܒܕܒܥܬܗ ܘܡܬܒܥܬܗ ܠܗ ܦܘܡܗ . ܘܦܝܫ ܗܕܝܡܐ
ܘܠܠܒܫܐ ܒܡܪܓܫܢܘܬܐ ܕܒܣܡܐ ܡܬܬܕܝܠܢܐ .

ܗ ـ ܦܛܪܐ :

ܗܢܘܢ ܣܘܓܐܐ ܠܗܘܪܫܢܐ ܕܦܛܪܐ ܣܓܝܐܐ . ܘܡܬܦܠܓ ܠܗ ܠܛܘܗܡܐ
ܠܒܝܫܘܬܐ ܘܡܘܦܩܐ ܡܬܬܪܢܐ . ܒܝܕ ܣܓܝܐ ܥܡܠܬܐ ܡܢ ܦܠܚܘܬܐ
ܣܘܬܢܬܐ ܦܛܪܐ ܡܬܘܡܝܐ ܥܘܡܠܐ ܣܓܝܐ (Metabolism) . ܘܡܛܠ
ܕܦܛܪܐ ܡܝܘܬܐ ܡܦܠܚܬܐ ܕܗܘܪܫܢܐ ܒܝܕ ܗܘܪܫܐ ܕܛܘܥܡܐ . ܗܠܐ ܕܬܚܘܬ
ܒܢܝܢܐ ܡܢ ܗܪܘܫܘܬܐ . ܐܝܟ ܕܡܬܦܠܦܠܗ ܠܝܒܫܐ ܘܚܡܘܪܐ . ܐܘ
ܡܬܘܝܢܬܐ ܦܫܝܛܬܐ . ܡܢܝ ܒܗܪܬܐ ܡܢ ܠܡܛܪܗ ܐܘ ܒܠܚܘܕܗ .
ܒܗܘܢܐ ܕܐܝܬ ܗܪܘܫܘܬܐ ܦܝܫ ܡܬܘܡܝܐ ܦܛܪܐ .

ܗ ـ ١ ـ ܦܛܪܐ ܛܒ̈ܐ ܘܦܛܪܐ ܒܝ̈ܫܐ :

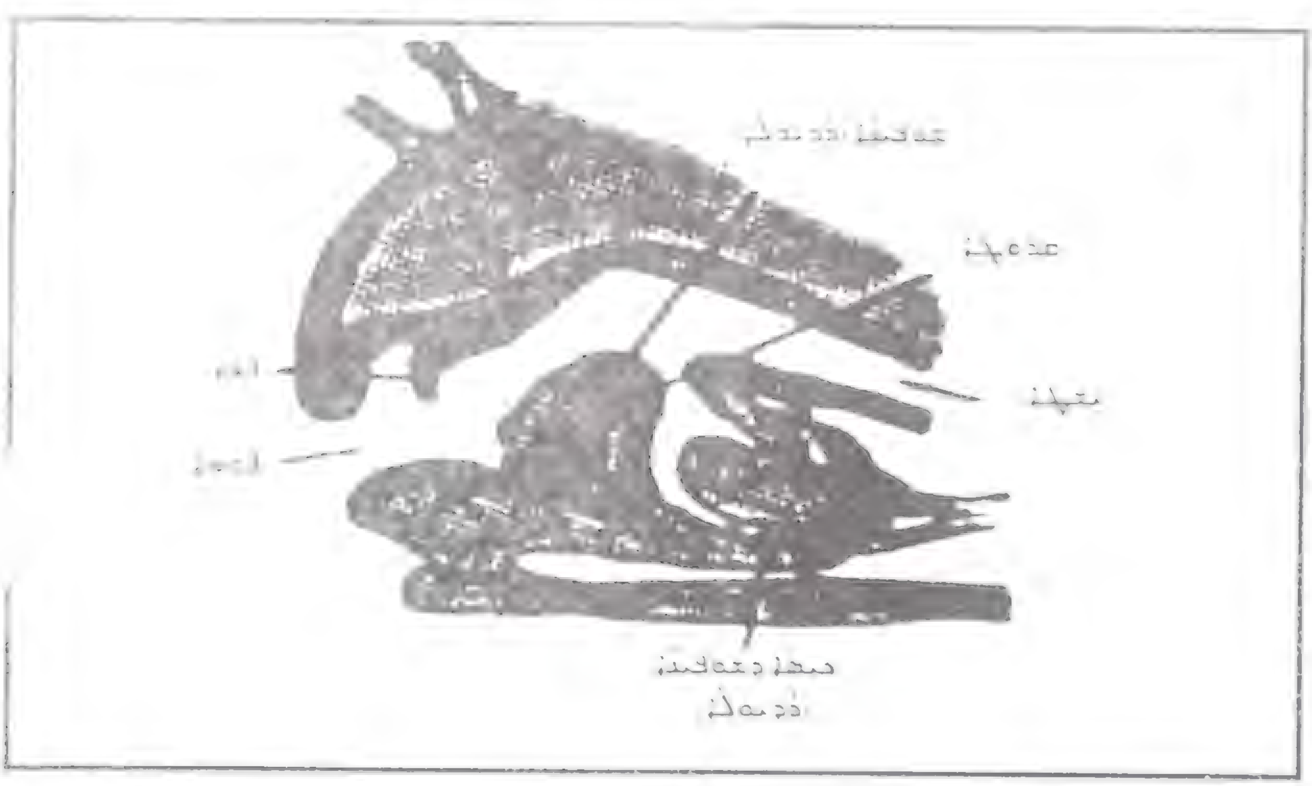
ܒܐܪܥܐ ܕܛܠܘܫܐ ܕܗܪܘܫܘܬܐ ܕܦܛܪܐ ܒܠܠܡܐ ܕܣܓܝܐ . ܒܡܘܬܠܗܘ.
ܗܠܝܢ ܐܪܒܥܐ ܝܠܗ : ܦܛܪܐ ܠܐ ܗܘܝܐ (ܦܛܪܐ ܛܒ̈ܐ) . ܘܦܛܪܐ ܒܝ̈ܫܐ
ܕܗܘܝܐ (ܦܛܪܐ ܒܝ̈ܫܐ) . ܘܦܛܪܐ ܣܠܝܩܬܐ (ܣܒܝܒܬܐ) . ܗܘ ܕܡܬܦܩܕ ܒܝܢ
ܐܢܐ ܗܪܟ ܐܪܒܥܐ . ܘܒܣܘܣ ܐܢܐ ܐܪܒܥܐ ܒܗܘܒܐ ܣܘܓܐܐ ܡܬܦܠܓܐ . ܘܡܢܝܗ
ܣܘܓܐܐ ܐܝܟ ܕܐܝܬܠܗܘ . ܒܘܪܢܐ ܦܛܪܐ . ܣܪܝܩܐ ܝܠܗ ܦܛܪܐ ܠܐ
ܢܦܩܠܬܐ ܘܣܝܢܐ ܒܘܦܐ (Primitive) ܐܝܟ ܒܪܫܢܬܐ . ܥܠ ܦܛܪܐ ܛܒ̈ܐ .

ܐܒܢ̈ܐ ܠܗ ܐܪܥܐ ܢܫܘܦ ܠܡܘܬܐ ܐܝܕܝܐ. ܬܪ̈ܝܢ ܦܬ̈ܟܐ ܠܗܘܢ، ܬܪܝܢ ܕܡܘܕܥܬܐ، ܘܟܠ ܚܕ ܡܢܗ ܠܗܘܢ.

٥ _ ٢ _ ܦܬ̈ܟܐ ܐܘܪܓܢ̈ܐ ܘܦܬ̈ܟܐ ܕܡܥܝ̈ܢܐ :

ܡܫܪܝܬܐ ܠܗ ܐܪܥܝܬܐ ܕܦܬ̈ܟܐ ܠܡܘܬ ܐܪܥܝܘܬܐ ܕܡܥܝܢܘܬܐ. ܐܝܟ ܕܐܡܪܝܢ ܠܗܘܢ، ܠܦܬ̈ܟܐ ܐܘܪܓܢ̈ܐ ܘܦܬ̈ܟܐ ܕܡܥܝ̈ܢܐ.

ܦܘܡ ܠܠܫܢܐ ܡܘܪܡܐ، ܡܢ ܟܠܗܘܢ ܠܡܘܟܠܐ ܦܬ̈ܟܐ، ܠܡܘܟܠܘܬܐ ܕܡܪܡܬܐ ܘܠܫܢܐ. ܡܫܪܝܘܬܐ ܕܐܘܪܚܐ ܡܢ ܕܡܠܬܐ. ܐܝܟ ܡܬܐ ܘܡܦܘܚܬܐ (Radula) (ܐܣܟܡܐ ١ _ ١٢) ، ܠܗ ܡܢܣܡܬܐ ܦܣܝܩܬܐ ܘܦܬܝܐ ܘܢܫܘܦܬܐ ܠܠܥܣܬܐ. ܠܗ ܬܪܬܝܢ ܘܦܬܚܐ ܡܢ ܡܢܐ ܐܝܬ ܡܢܘܕܥܬܐ. ܦܬ̈ܟܐ ܐܘܪܓܢܐ ܘܦܬܚܐ ܡܢܐ ܡܢܘܕܥܬܐ ܕܦܬ̈ܟܐ ܐܘܪܓܢ̈ܐ. ܬܪܬܝ ܡܫܘܕܥܬܐ ܕܡܘܕܥܢܐ ܠܗ ܢܬܦܐ ܦܬ̈ܟܐ. ܐܝܟ ܕܠܗ ܐܡܬܝܢܘܬܐ ܠܗ ܐܘܪܚܘܬܐ ܘܡܥܘܪܐ ܐܣܬܝܟܐ ܕܠܥܣܬܐ، ܐܝܟ ܦܫܘܛܘܬܐ ܡܬܪܬܐ ܘܡܘܠܕܬܐ ܕܠܬܬܐ. ܘܬܪܬܝ ܠܗ ܐܘ ܐܝܟܢܐ ܐܠ ܡܠܟ ܡܢ ܟܘܡܐ. ܐܘ ܝܗܒܐ ܕܪܡܠܐ. ܠܡܦܬܚܘܬܐ ܕܦܬܘܚܬܐ ܕܡܘܕܥܬܐ. ܠܟܡܐ ܘܬܘܕܐ ܕܠܝܐ ܟܡܢܐ.



ܐܣܟܡܐ (١ _ ١٢) ܡܫܡܠܝܬܐ ܐܪܓܘܢ̈ܐ ܠܗ ܦܘܡܐ ܕܫܠܘܢܐ

ܘܒܬܪ ܗܘܐ ܢܦܩܬ ܫܘܕܥܘܬܐ ܕܦܬܪܐ ܐܪܗܢܝܘܣ . ܚܕܐ ܥܠܬܐ ܡܢ ܦܠܠܘܬܐ ܟܝܡܝܝܬܐ . ܟܕ ܡܫܝܠܝܢ ܕܗܘ ܕܗܘܕܥܢܐ ܗܠܝܢ ܟܡܝܐ . ܠܡܠܘܐܐ ܦܬܝܟܐ ܒܠܝܗ ܡܢܝܘܬܢܝܬܐ . ܐܝܟ ܟܠܗܘܢ ܘܫܡܘܕܐ ܐܡܝܢܐ ܘܗܕܪܝܐ ܘܡܕܪܝܗ . ܘܐܘܐ ܦܬܪܐ ܠܗ ܕܗܪܐ ܦܬܪܐ ܟܝܡܝܝܐ . ܘܟܝܕܘܥܐ ܠܗܘܐ ܗܘܡܝ ܠܟ ܚܕܢܐ ܗܕܘܝܗ ܐܕܝܐ ܡܢ ܦܬܪܐ . ܐܝܟ ܕܟܕܢܐ ܟܟܝܢܐ ܕܕܦܟܬܐ ܕܪܗܕܐ ܠܗ ܚܠܝܠܘܬܐ ܦܘܫܟܬܐ . ܗܘ ܕܡܟܝܘܬܦ ܟܦܠܝܓܘܬܐ ܕܡܠܘܐܐ ܕܝܥܢܐ (ܠܟ ܚܝܠܐ) . ܘܐܝܟ ܟܗܘܕܥܢܐ ܠܟܝܫܐ . ܠܥܡܕܐ ܗܕܢܐ .

ܘܟܕܢܐ ܠܗ ܫܘܕܥܘܬܐ ܕܦܬܪܐ ܟܝܡܝܢܐ . ܚܕܕܬܐ ܕܐܝܘܢܐ (Ions) ܡܘܗܕܢܐ ܠܟܬܘܒܘܬܐ ܚܘܫܒܢܝܬܐ . ܐܝܟ ܐܝܘܢܐ ܕܐܘܦܝܘܡ ܘܦܘܬܫܘܡ ܘܟܠܫܝܘܡ ܘܟܠܘܪܝܢ ܘܟܒܪܝܬܘܢܝܬܐ . ܒܝܡ ܦܪܥܬܐ ܕܡܢܝܘܬܢܝܬܐ ܪܘܪܒܬܐ . ܐܝܟ ܦܪܘܬܝܢܐ ܠܡܢܝܘܬܢܝܬܐ ܟܝ ܘܟܘܪܢܝܬܐ . ܐܝܟܘܬ ܫܡܘܕܐ ܐܡܝܢܐ . ܕܦܬܪܐ ܦܬܝܟܬܐ ܠܡܢܘܬܗ ܠܕܡܐ . ܘܡܬܢܒܝܬܗ ܡܝܢܐ ܠܝܗ ܟܘܪܬܐ .

٥ — ٣ - ܐܠܩܛܪܘܢܐ :

ܡܪܦܐ ܟܘܪܬܐ ܘܬܒܪܢܝܬܐ ܡܦܥܪܢܝܬܐ ܡܢܝܘܬܢܝܬܐ ܦܪܘܬܝܢܝܬܐ . ܐܝܟ ܕܡܬܚܠܦ ܚܕ ܓܪܐ ܐܟܘܦܪܐ . ܠܗ ܫܘܕܥܘܬܐ ܕܦܬܪܐ ܟܝܡܝܢܐ . ܦܝܟ ܡܟܘܡܘܗ ܐܠܩܛܪܘܢܐ . ܘܟܝܘܪܬܐ ܠܗܢܝܬܐ ܚܘܥܝܢܐ ܗܢܐ ܐܠܩܛܪܘܢܐ ܐܟܘܠܐ ܡܦܝܢܐ ܠܦܠܠܘܬܐ ܚܘܫܒܢܝܬܐ . ܐܝܟ ܕܟܕܢ ܠܗ ܟܘܪܬܐ ܕܠܘܡܝܐ ܕܐܝܬܐ ܚܢܐ . ܐܘ ܟܪܝܘܬܗ .

ܘܦܝܠܘ ܡܘܠܡܕܢܐ ܫܘܕܥܘܬܐ ܕܦܪܥܬܐ ܕܐܠܩܛܪܘܢܐ ܠܓܘܐ ܫܘܡܫܬܐ ܫܢܬܐ ١٨٩٧ . ܟܝܕ ܝܕܘܥܐ ܐܠܡܢܝܐ ܓܘܪܓ ܟܘܟܝܪ . ܐܝܟ ܕܦܘܠܚܢܠܗ ܟܝܘܪܬܐ ܡܢ ܣܘܡܟܐ ܚܢܐ . ܘܡܫܘܚܬܠܗ ܕܗܘ ܐܝܬܠܗ ܡܝܘܬܐ ܚܠ ܡܫܟܝܢܬܐ ܕܟܝܘܪܐ ܘܟܠܘܟܘܢ . ܘܡܫܠܡܘ ܠܟܘܠܐ . ܐܝܟܘܬ ܕܟܚܕܝ ܟܘܪܬܐ ܕܣܘܡܟܐ ܚܢܐ . ܘܫܘܠܗ ܕܫܟܝܢܘܬܐ ܟܠܗܐ ܡܫܪܟܐ ܠܐܝܢܐ ܐܠܩܛܪܘܢܐ . ܘܠܐ ܡܬܟܝܪܐ ܚܠ ܡܠܘܐܐ ܐܦܝܐ (ܥܡܕܐ ܕܟܠܗܘܢ ܟܠܗܘܐ ܐܝܬܝܘܬܐ) . ܘܗܘ ܒܠܗ ܡܕܡܝܢܐ ܕܪܡܘܠܗ ܠܗܘܬܗ ܡܢܝܘܬܢܝܬܐ ܡܢ ܦܪܘܬܝܢܐ .

٥ - ٣ - ١ - ܡܫܡܗܘܬܐ ܕܐܢܙܝܡ̈ܐ :

ܦܝܫ ܡܫܘܕܥܐ ܫܡܐ ܕܐܢܙܝܡܐ ܡܢ ܫܡܐ ܕܡܠܘܐܐ ܐܘܟܝܬ (Substrate) ܗܘ ܕܦܥܠܐ ܥܠܗ ܡܫܘܡܠܐ ܫܡܗ . ܘܐܝܬ ܗܘܐ ܟܠܐ ܡܢ ܦܘܫܩܐ ܕܫܡܗ̈ܐ ܗܢ̈ܐ :

ܐܢܙܝܡܐ ܕܡܫܪܐ ܥܡܝܠܐ . ܗܘ ܕܡܦܠܓ ܠܫܪܟܐ ܕܥܡܝܠܐ (ܥܡܝܠܘܣ) ܠܫܪܟܐ ܕܫܘܟܪܐ (ܡܠܛܘܣ) . ܘܫܪܟܐ ܕܐܫܟܐ (ܦܪܘܛܐܘܣ) ܦܝܫܐ ܥܠܗ ܡܫܘܡܗܐ ܦܪܘܬܐܣ . ܘܐܢܙܝܡܐ ܗܘ ܕܡܦܠܓ ܠܫܪܟܐ ܕܫܘܡܢܐ (ܠܝܦܝܕܘܣ) ܦܝܫܐ ܥܠܗ ܡܫܘܡܗܐ ܠܝܦܝܣ . ܘܗܘ ܕܡܦܠܓ ܠܫܪܟܐ ܕܐܘܪܝܐ ܦܝܫܐ ܥܠܗ ܡܫܘܡܗܐ ܐܘܪܝܣ . ܘܡܢ ܐܝܟܐ ܟܝܘܢ ܕܫܡܐ ܕܐܢܙܝܡܐ . ܦܝܫ ܡܫܘܕܥܐ ܡܢ ܥܠܘܐܐ ܐܘܟܝܬ ܒܫܘܠܡܐ ܕܫܡܐ ܕܥܠܬܐ ܠܗ (ܝܣ) . ܘܠܦܘܡ ܐܝܟܐ ܕܐܢܙܝܡܐ ܡܫܚܠܦܢܐ ܠܦܘܠܚܢܐ ܡܫܚܠܦܢܐ . ܦܝܫ ܦܘܠܚܢܐ ܡܫܚܠܦܐ ܕܘܟܝܬܐ . ܘܡܢ ܐܝܟܐ ܐܝܟ ܐܢܙܝܡܐ ܕܐܢܐ ܕܡܦܠܓܐ . ܠܡܫܡܗܘ ܒܫܡܐ ܕܦܘܠܚܢܗ . ܘܡܢ ܐܢܙܝܡܐ ܡܫܚܠܦܢܐ ܐܝܟ ܦܦܣܝܢ ܘܬܪܝܦܣܝܢ ܘܟܝܡܘܬܪܝܦܣܝܢ .

٥ - ٣ - ٢ - ܦܪ̈ܫܘܬܐ ܕܦܘܠܚܢ̈ܐ ܕܐܢܙܝܡ̈ܐ :

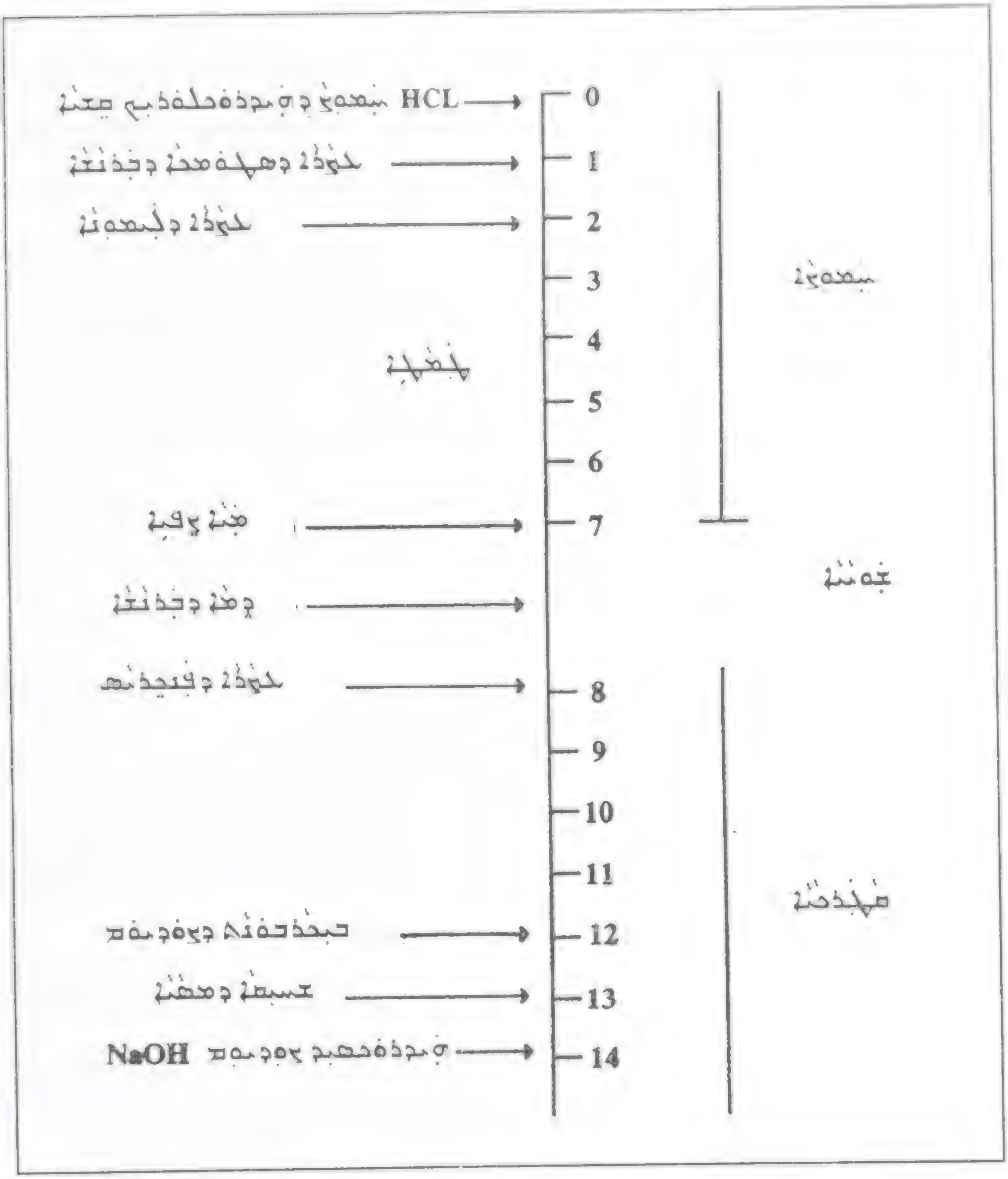
ܡܢ ܦܪܝܫܘܬܐ ܐܝܟ ܕܡܦܪܫ ܠܐܢܙܝܡܐ ܕܦܘܠܚܢܐ ܕܐܢܙܝܡܐ . ܦܪܝܫܘܬܐ ܕ (ܕܘܟܝܬܐ ܘܚܡܝܡܘܬܐ) ܘܚܝܠܐ ܐܝܟܐ ܠܗܝܢ . ܕܐܢܙܝܡܐ ܥܠܗ ܥܠܘܐܐ ܦܪܘܛܝܢܐ . ܡܛܠ ܐܢܙܝܡܐ ܕܦܪܘܛܝܢܐ ܐܝܬܝܗ . ܠܗܘܢ ܚܡܝܡܘܬܐ ܘܚܡܝܡܘܬܐ ܕܡܝܐ ܦܪܘܛܝܢܐ (PH) . ܐܝܟ ܕܚܡܝܡܘܬܐ (١ - ١٢) .

ܘܚܡܝܡܘܬܐ ܕܟܝܡܝܐ ܕܦܘܠܚܢܐ ܡܫܚܠܦܢܐ . ܐܝܟ ܕܫܚܠܦܢ ܒܝܢܝ ܐܢܙܝܡܐ . ܐܝܟ ܚܡܝܡܘܬܐ ܡܫܚܠܦܢܐ . ܦܝܫ ܦܘܫܩܐ ܗܢܐ ܕܟܠܗܝܢ ܗܢ̈ܐ :

١ - ܕܟܠܐ ܚܘܫܒܐ ܒܝܢ ܡܫܚܠܦܢܘܬܐ ܕܐܢܙܝܡܐ ܘܫܪܟܐ ܦܘܠܚܢܐ ܡܫܚܠܦܢܘܬܐ ܕܥܠܘܐܐ ܐܘܟܝܬ . ܠܡܫܡܗܘܬܐ ܡܫܚܠܦܐ ܕܐܢܙܝܡܐ . ܥܠܘܐܐ ܐܘܟܝܬ .

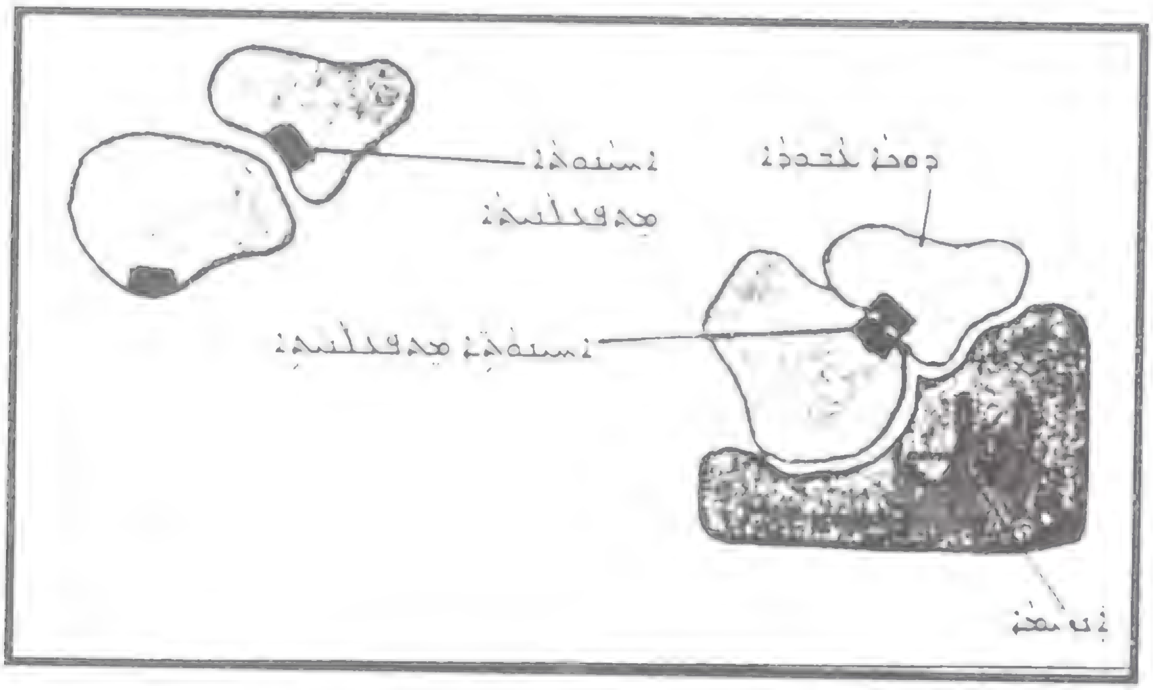
٢ - ܕܟܠܗ ܐܝܬ ܚܘܫܒܐ ܠܐܢܙܝܡܘܬܐ ܕܡܫܚܠܦܢܘܬܐ ܕܚܡܝܡܘܬܐ ܕܡܫܚܠܦܢܘܬܐ ܕܥܠܘܐܐ ܐܘܟܝܬ . ܟܠ ܚܘܫܒܐ ܕܡܫܚܠܦܢܘܬܐ ܕܐܢܙܝܡܐ . ܘܐ

ܣܓܝܐܐ ܐܢܝܢ ܕܡܬܩܪܝܢ ܠܕܘܟܝܬܐ ܚܝܘܬܐ Activesites ܠܗ ܡܢܬܘܬܢܝܬܐ ܕܐܢܙܝܡܐ، ܘܟܠܢܐ ܡܫܬܚܠܦܢܘܬܐ. ܐܝܟ ܕܝܕܥܝܢ ܡܘܦܠܐ ܘܡܝܠܐ.



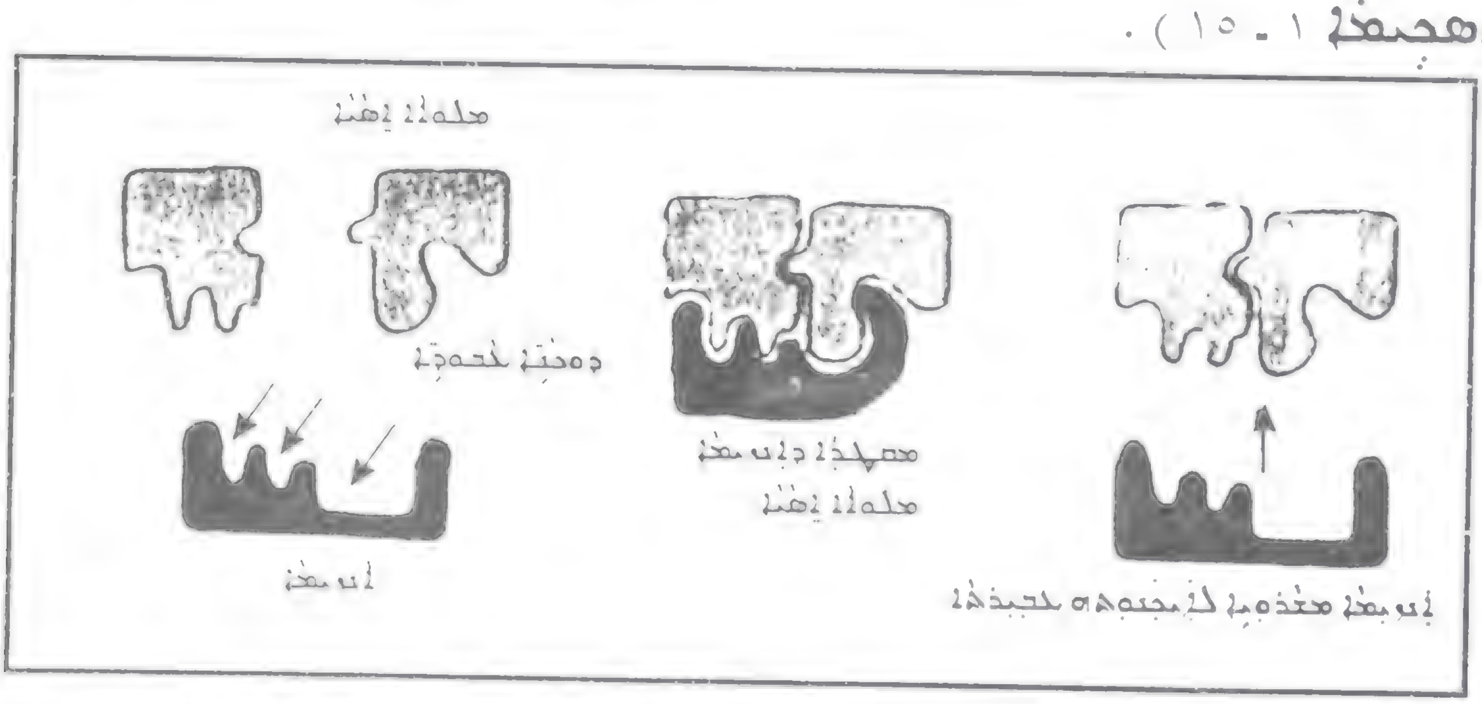
ܨܘܪܬܐ (١ — ١٣) ܦܫܛܐ ܡܘܫܚܬܐ ܠܪܘܡܐ
ܗܝܕܪܘܓܝܢܐ PH ܠܣܢܕܡܐ ܗܘܝܐ

٣ـ ܦܬܐ ܒܦܬܐ ܕܚܘܒܪܐ ܒܝܢ ܐܢܬܝܓܢܐ ܘܡܠܘܐܐ ܐܚܢܐ . ܗܘܐ ܒܝܠܝܐ ܕܡܠܘܐܐ ܦܠܓܢܐ . ܥܠܝܡܐ ܠܕܘܟܝܐ ܐܚܪܢܐ . ܠܐ ܡܢܬܘܣܝܬܐ ܕܐܢܬܝܓܢܐ . ܘܐܝܟܢܐ ܐܡܪܘ ܒܐܣܝܪܘܬܐ ܡܣܠܝܬܐ . ܘܐܦ ܗܘܝ ܐܣܝܪܘܬܐ ܠܐ ܡܠܘܐܐ ܦܠܓܝܐ ܒܕܘܟܝܐ ܕܐܚܪܢܐ ܡܐܠܝܢ ܒܦܠܓܘܬܐ ܒܗ ܣܕܪܐ (ܨܘܪܬܐ (١ ـ ١٤) .



ܨܘܪܬܐ (١ ـ ١٤) ܡܨܘܪܬܐ ܡܢܘܪܐ ܠܚܘܝܬܐ ܕܦܘܠܚܢܐ ܕܐܢܬܝܓܢܐ

ܘܒܪ ܕܦܪܩ ܐܢܬܝܓܢܐ ܡܢ ܦܘܠܚܢܐ . ܡܫܠܡ ܡܣܝܟܬܐ ܕܐܢܬܝܓܢܐ ـ ܡܠܘܐܐ ܐܚܢܐ ܠܡܣܝܟܬܐ ܕܐܢܬܝܓܢܐ ـ ܡܠܘܐܐ ܢܦܫܐ ـ ܘܦܪܫܘܬܐ ܕܦܠܓܘܬܐ . ܦܪܩ ܐܢܬܝܓܢܐ ܡܢ ܡܠܘܐܐ ܢܦܫܐ ، ܕܡܫܪܐ ܦܘܠܚܢܐ ܡܢ ܕܪܟ (ܨܘܪܬܐ ١ ـ ١٥) .



ܨܘܪܬܐ (١ ـ ١٥) ܡܢܘܪܐ ܠܐܣܝܪܘܬܐ ܕܦܘܠܚܢܐ ܕܐܢܬܝܓܢܐ

ܡܢ ܗܕܐ ܕܡܕܡܠܘ ܡܬܝܐ ܕܢܠܦܐ ܥܕܕܐ ܕܒܐ ܡܢܝܢܐ :

١. ܫܡܫܘܬܐ ܟܠܝܬܐ ܡܫܠܦܐ ܠܐܗܓܝܬܐ ܕܡܢܓܘܢܝܬܐ ܕܐܬܘܬܐ . ܘܡܟܠܝܐ ܠܫܡܫܘܬܐ ܐܢܫܝܬܐ ܠܦܘܠܚܢܐ ܕܦܢܝܬܐ ܟܬܒܢܝܬܐ . ܒܡܢܓܘܢܝܬܐ ܕܐܬܘܬܐ . ܘܦܠܚܐ ܡܬܘܡܝܬܐ ܐܡܪܬܐ ܐܘ ܦܬܓܡܐ ܕܐܣܝܪܬܐ ܡܫܡܫܢܐ ܒܦܠܚܘܬܐ ܣܘܟܝܬܐ ܗܝ ܕܐܝܬ ܠܗ ܡܠܘܐܐ ܪܟܝܟܐ .

٢. ܦܠܓܐ ܡܢܓܘܢܝܬܐ ܕܐܬܘܬܐ ܡܢ ܦܠܚܘܬܐ ܕܠܐ ܥܘܫܠܦܐ ܒܥܘܒܕܘ ܗܘܕܐ ܒܦܬܝ ܡܘܪܒܐ ܟܠܗ ܥܘܗܕܐ ܕܟܡܘܠܐ ܡܦܫܟܐ . ܗܘ ܕܡܥܒܕ ܠܦܠܚܘܬܐ ܟܠܫܘ ، ܕܠܐ ܦܬܚܐ ܡܘܟܪܐ .

٣. ܘܐܟܘܬ ܕܡܗܕܒܕܐ ܫܡܫܘܬܐ ܟܠܝܬܐ ܟܠ ܕܟܠܝܬܐ ܕܐܬܘܬܐ . ܡܟܒܪ ܕܡܫܐ ܗܡܕܘܠܝܢܐ ܟܠ ܐܗܓܝܬܐ ܕܡܢܓܘܢܐ ܕܐܬܘܬܐ . ܒܟܕܢܐ ܕܡܦܩܬܐ ܐܘ ܕܡܥܬܐ ܕܦܕܠܐ ܕܫܡܫܘܬܐ ܕܡܝܟܐ . ܗܘ ܕܒܟܕܝ ܠܗܘ ܦܠܚܘܬܐ ܐܢܫܝܬܐ . ܘܟܠ ܐܬܘܬܐ ܐܝܬܠܗ ܕܡܫܐ ܗܡܕܘܠܝܢܐ ܒܝ ܠܗܘܦܫܢܐ . ܦܠܝ ܠܝܟܘ ܒܐܗܓܝܬܐ ܒܝ ܠܟܢܐ . ܘܟܠܟܐ ܗܘ ܡܦܝܫ ܡܢ ܠܗ ܠܡܘܬܐ ܕܐܝܬܝܐ ܣܢܐ . ܒܟܕܢܐ ܕܠܥܕܬܐ ܕܥܘܫܠܦܐ ܡܝܬܠܕܢܐ ܘܟܡܘܬܐ ܒܕܡܫܐ ܗܡܕܘܠܝܢܐ . ܡܟܠܠ ܣܕܝܬܐ ܕܐܬܘܬܐ ܐܢܫܝܬܐ . ܠܐܗܝܘܬܐ ܕܣܘܬܐ . ܐܘ ܟܠܝܬܗ ܡܢ ܦܘܠܚܢܐ . ܘܠܗ ܒܕܢܟܐ ܦܝܫ ܕܡܫܐ ܗܡܕܘܠܝܢܐ ܠܗ ܗܣܘܝܐ ܒܝܬܐ ܣܓܝ ٠,٧ . ܘܐܝܬܘܗܝ ܡܢ ܐܗܐ ܡܥܒܪܢܐ ܢܗܒܪ ܡܢ ٨,٧ ܐܘ ܡܠܒܠ ܡܢ ٠,٧ ܡܟܒܪܢܐ ܡܢܘܬܐ . ܘܐܝܬ ܐܝܬܘܬܐ ܡܢ ܡܢܘܬܐ ܕܟܒܪܐ ܟܠܝܬܗ ܠܐܗܓܝܬܐ ܕܦܕܠܐ ܕܫܡܫܘܬܐ . ܗܕܟܐ ܥܘܫܠܦܐ ܠܐܗܓܝܬܐ ܕܐܬܘܬܐ ܐܢܫܝܬܐ ܠܐܗܝܘܬܐ ܕܥܘܫܠܦܐ ܣܢܐ . ܐܦ ܡܢܦܩܬܐ ܕܦܕܠܐ ܕܫܡܫܘܬܐ ܡܟܒܪܢܐ ܡܢܦܩܬܐ ܐܦ ܒܡܝܟܐ ܕܦܠܚܘܬܐ ܥܘܫܠܦ ܣܢܐ .

٥ — ٣ — ٣ ـ ܐܢܙܝܡܐ ܡܦܪ̈ܩܢܐ :

ܘܗܘܕܪܢܘܬܐ ܕܦܪ̈ܩܐ ܕܣܘܕ̈ܗܢܐ ܝܠܗ ܐܠܝܨܐ ܥܡ ܡ̈ܝܐ . ܟܪ̈ܝܐ ܒܣܘܪܘܚܐ ܥܡ ܐܢܙܝܡܐ ܐܝܟ ܕܡܪܦܠܘܗܝ . ܣܒܪܐ ܡܦܪ̈ܩܢܘܬܐ ܘܡ̈ܝܐ ܝܠܗ ܟܡܘܠܐ ܐܢ̈ܝܐ ܒܡܪܬܒܢܘܬܐ ܕܡܠܘܐܐ ܣܘܕ̈ܗܢܐ . ܘܥܠܡܐ ܠܡܘܢܟܘ ܠܗ ܚܕܐ ܦܠܚܘܬܐ ܟܝܡܝܐ ܐܝܟ ܦܪܝܕܐ ܕܟܪ̈ܝܐ ܘܡܫܚܐ ܐܝܟ ܕܦܪ̈ܫܐ ܝܠܗ ܡܣܘܦܢܐ ܠܗ ܣܘܠܝܬܐ ܕܒܪ̈ܬܐ ܡܢܐ :

ܐܢܙܝܡܐ

ܣܘܕ̈ܗܢܐ + ܡ̈ܝܐ ← ܢܩܝܫܐ ܕܚܕ̈ܐ ܕܣܘܕ̈ܗܢܐ

ܣܘܟܪܝܙ

$C_{12}H_{22}O_{11} + H_2O \longrightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

ܫܟܪܐ ܕܩܢܝܐ ((ܣܘܟܪܘܙ)) ܓܠܘܟܘܙ ܦܪܘܟܬܘܙ

ܘܗܕ ܟܪܘܐ ܐܘܪܚܐ . ܦܝܫ ܡܣܦܝܕܐ ܡܠܘ̈ܐܐ ܡܫܚ̈ܐ

ܠܐܝܦܝܙ

ܡܫܚܐ + ܡ̈ܝܐ ← ܚܡܘܨܐ ܦܪܝܬܐ + ܓܠܝܣܪܝܢ

ܘܐܝܟܢܐ ܟܠܘܫ ܕܐܢܙܝܡܐ ܡܨܝܢ ܒܡܫܪܘܝܘܬܐ ܕܦܪ̈ܩܐ ܡ̈ܝܐ ܠܡܠܘ̈ܐܐ ܣܘܕ̈ܗܢܐ . ܘܡܢ ܗܪܟܐ ܕܡܬܡܠܐ ܒܦܠܚܐ ܗܕܟ ܕܝܠܢܝܐ ܠܐܢܙܝܡܐ ܡܦܪ̈ܩܢܐ :

١ ـ ܐܝܟ ܠܗ ܪܒܘܬܐ ܕܚܝܠܘܬܐ ܦܠܚ ܠܒܪ ܡܢ ܟܘܪܗܐ ܐܝܟ ܕܡܨܝܢ ܒܪܦܘܝܗ . ܒܣܦܩܐ ܕܪܒܘܬܐ ܕܐܢܙܝܡܐ . ܐܝܟ ܕܦܝܫ ܡܣܘܦܢܐ ܠܗ ܟܘܪܗܐ . ܘܡܫܪܝ ܠܗܘܢ ܒܦܠܚܘܬܐ ܕܚܘܠܡܐ ܫܪܝܪܬܐ .

٢ ـ ܠܐ ܝܠܗ ܚܕܝܬܐ ܦܘܠܚܢܐ ܕܐܢܙܝܡܐ ܡܦܪ̈ܩܢܐ ܥܠ ܚܕܐ ܦܠܚܘܬܐ . ܐܝܟ ܕܝܠܗ ܐܢܫܝܘܬܐ ܒܪܒܘܬܐ ܕܐܢܙܝܡܐ ܠܗ ܟܘܪܗܐ . ܐܠܐ ܫܪܟܝ ܠܗ ܦܘܠܚܢܗ . ܡܠܘܐܐ ܪܒܐ . ܡܢ ܠܗ ܦܠܚܘܬܐ ܣܓܝܐܬܐ . ܘܐܢܙܝܡܐ ܕܠܐܡܟܝ ܠܐ ܝܠܗ ܕܝܠܢܝܐ . ܐܝܟ ܕܚܘܠܡ . ܒܡܘܬܒܐ ܕܚܕ ܐܢܫܐ ܦܪܝܫܐ

ܡܢ ܡܠܘܬܐ ܡܟܣܝܬܐ . ܐܠܐ ܡܢܗ. ܐܘܟܐ ܡܬܚܠܦܐ ܡܢܝܗ ܠܡܘܡܢܝܗ . ܡܢ
ܣܡܘܟܐ ܐܚܪ̈ܢܐ ܘܓܠܝܚܪܝܢ . ܘܗܢܐ ܕܝܠܗ ܐܚܪܝܐ ܟܘܕ ܐܬܘܪܝܐ ܕܠܐܢܝܗ .
ܝܠܗ ܐܚܪܝܐ ܥܠ ܣܕܪ̈ܐ ܐܬܘܪ̈ܝܐ ܡܕܢܚ̈ܝܐ ܠܡܥܪ̈ܒܝܐ ܘܟܪ̈ܣܛܝܢܐ ܘܐܕܘܬܐ .
ܐܘܟܝܬ ܐܝܟ ܡܟܝܢܐ ܡܢܐ ܥܠ ܡܘܢܐܬܐ ܕܟܬ̈ܒܐ ܡܢ ܦܪܘܬܝܐ ܘܟܪ̈ܣܛܝܢܐ ܘܐܕܘܬܐ .
ܘܐܝܬ ܝܠܗ ܚܕ ܦܘܪܫܢܐ ܓܠܝܐ ܡܢ ܟܬܝܒܬܐ ܕܦܫܝܛܬܐ ܕܐܬܘܪܝܐ . ܠܗ
ܟܬܒܬܐ . ܐܝܟ ܕܡܬܚܙܝܐ ܚܕܐ ܦܫܝܛܘܬܐ ܪܒܐ ܠܗܝ . ܐܣܛܪܐ ܟܡܘܢܬܐ
ܐܘ ܟܢܘܫܬܐ ܕܡܢܗܘܢܝܬܐ . ܠܚܕ ܡܠܘܬܐ ܟܝܡܝܬܐ . ܘܐܝܬ ܡܟܟܒ ܠܡܝܢܐ
ܕܐܬܘܪܝܐ ܠܗ ܟܬܒܬܐ ܢܚܝܪ ܡܢ ܐܠܦܐ .

ܡܝܢܐ ܕܐܬܘܪܝܐ ܡܕܢܚ̈ܝܐ ܡܠܝܠܐ ܝܠܗ ܡܬܚܠܦܢܝܬܐ . ܘܟܬܒܐ ܓܠܝܬܐ
ܕܐܝܬ ܠܗܘܢܬܐ ܕܐܣܬܢܬܐ ܐܝܟ ܕܦܪܝܫܐ ܡܢܐ ܟܐܬܘܪܝܐ ܡܕܢܚ̈ܝܐ . ܡܪܝ
ܦܪܫܬܐ ܪܘܚܬܐ ܠܗ ܡܠܘܬܐ ܐܘܪܫܝܢܐ ܘܐܣܬܢܬܐ ܕܐܫܪܐ ܣܡܘܟܐ
ܐܚܪ̈ܢܐ ܟܓܠܝܚܪܝܢ . ܕܠܗ ܡܢܗܘܢܝܬܐ ܕܐܚܪ̈ܢܐ . ܝܠܗ ܟܢܐܗ . ܠܗ ܪܟܘܬܐ
ܕܡܠܘܬܐ ܡܟܣܝܬܐ . ܐܦ ܟܣܘܣ ܕܐܣܬܢܬܐ ܦܦܬܝܪܐ . ܐܝܟ ܕܐܫܪܝ
ܣܡܘܟܐ ܐܡܝܢܐ . ܟܡܢܗܘܢܝܬܐ ܕܦܪܘܬܝܢ . ܝܠܗ ܟܢܐܗ ܠܗ ܟܠܝܗ
ܦܪܘܬܝܐ . ܘܟܠ ܕܐܝܬ ܐܠܝܠܘܗ̇ ܦܪܘܬܝܘܬܐ .

ܐܟܝܕ ܦܘܠܚܢܐ ܕܐܬܘܪܝܐ . ܘܡܢܝܗ ܡܦܥܪ̈ܒܝܐ ܟܪܟܐ ܕܣܡܝܡܘܬܐ .
ܘܐܢܟܐ ܡܠܘܠܘܬܐ ܕܦܫܝܛܘܬܐ ܐܬܘܪܝܬܐ ܟܘܪܬܐ ܟܦܝܦܬܐ . ܟܪܡܘܟܠ
ܘܢܟܬܐ ܕܝܫܪܐ ܟܪ̈ܟܐ ܟܟܠ ܠܗܝ .

ܐܝܬ ܡܟܪ̈ܐ ܡܠܘܠܘܬܐ ܕܦܫܝܛܘܬܐ ܟܘܠܬܐ ܟܪܐ ܡܬܝܬܐܗ ܠܟܪ̈ܐ
ܗܘܦܢܐ ܘ ܗ . ܘܟܠܢܐ ܦܫܝܛܘܬܐ ܟܝܟܪܐ ܕܡܬܝܬܐ ܕܟܪܟܐ ܕܣܡܝܡܘܬܐ
ܘ ܗ . ܐܦ ܐܟܝܕܐ ܡܠܘܠܘܬܐ ܕܦܫܝܛܘܬܐ ܐܬܘܪܝܬܐ ܟܟܪ̈ܢܐ
ܕܟܣܠܦܬܐ ܕܡܬܚܢܐ ܕܝܠܢܝܐ ܠܪܘܡܐ ܘܡܕܪܘܓܝܢܐ ܕܐܬܘܪܝܐ . ܘܣܕܟܡܐ
ܡܢܝܗ ܦܠܣ ܟܦܘܡܘܬܐ ܝܠܝܬܐ ܟܣܕ ܡܟܢܐ ܣܡܘܟܐ (ܦܦܬܝܪ ܟܪܘܡܐ
ܘܡܕܪܘܓܝܢܐ ܟܡܣܘܬܗ ܒ) . ܘܐܣܪܝܐ ܟܣܕ ܡܟܢܐ ܡܬܪܟܢܐ (ܐܪܦܫܝܪ
ܟܪܘܡܐ ܘܡܕܪܘܓܝܢܐ ܟܡܣܘܬܗ ܓ) . ܘܦܝܫܐ ܝܠܗ ܝܕܝܥܐ ܗܘ ܟܪܟܐ .
ܟܪܟܐ ܓܘܦܫܢܐ ܠܪܘܡܐ ܘܡܕܪܘܓܝܢܐ . ܘܢܦܩܐ ܐܝܕܘܬܐ ܕܐܬܘܪܝܐ
ܡܦܥܪ̈ܒܝܐ ܟܣܘܬܐ . ܐܝܟ ܕܐܝܬܠܗ . ܟܢܝܕܐ ܕܡܬܪܫܢܘܬܐ ܕܝܠܢܝܐ .

ܐܝܬܘܬܐ ܕܡܠܘܐܐ ܗܘܪܡܘܢܐ ܐܚܪܢܐ ، ܗܘ ܕܡܬܪܡܐ ܥܠܘܗܝ ܠܗ ܣܝܘܡܐ . ܘܣܝܘܡܐ ܐܝܟ ܕܡܬܪܡܐ ܥܠ ܕܡܐ ܐܣܝ ܗܘܠܟܐ ܘܪܣܝܐ ، ܒܣܘܣ ܕܒܘܬܐ ܕܐܢܘܢܐ ܡܦܪܕܢܐ ܒܝܢܐ ܡܢ ܦܪܘܬܘܢܝܘܬܐ ، ܘܩܝܘܪܐ ܕܒܐ ܡܢ ܒܪܒܘܙܪܝܘܬܐ .

ܘܪܘܣ ܐܝܟ ܐܡܝܢܘܬܐ ܡܢ ܠܣܡܘܬܐ ܒܝܢ ܐܢܘܢܐ ܦܪܘܪܐ ، ܘܗܘܪܡܘܢܐ ܗܝܟܐ ܥܠܘܗܝ ، ܕܣܒܒ ܣܝܘܬܐ ܡܬܡܡܢܝܬܐ ، ܐܝܟ ܕܡܣܒܒ ܒܗܘܪܡܘܢܝܗܝ ܥܠ ܘܡܘܪܐ ܕܡܡܠܠܢܐ . ܐܘ ܒܚܘܪܢܬܗ ܘܡܣܠܗ ܠܡܡܠܠܢܐ . ܠܐܝܟܐ ܗܘܝ ܐܢܘܢܐ ܡܦܪܕܢܐ ܡܫܡܫܐ ܕܒܐ . ܠܗܘܢܐ ܕܗܘܪܡܘܢܐ ܡܥܒܕܢܐ ܠܠܡܠܘܬܐ . ܘܠܐ ܠܗ ܗܝܡܢܐ ܠܦܪܕܐ . ܘܦܪܝܫܬܐ ܠܗ ܐܡܝܢܘܬܐ ܒܣܝܘܬܐ ܣܠܩܬܗ ܣܝܬܐ . ܘܡܪܝܡ ܡܬܪܡܢܘܬܐ ܣܚܘܪܬܐ (ܡܪܘܬܐ) . ܐܝܟ ܕܡܬܪܡܐ ܥܠ [illegible] ܡܣܠܩܐ ܡܢ ܗܘܪܡܘܢܐ . ܘܡܝܢܗ ܒܪܢܫܐ . ܒܕ ܒܣܘܣ ܠܗ [illegible] ܡܦܪܕܢܐ ، ܡܢܝܢܐ ܠܚܘܪܐ ܡܢ ܐܢܘܢܐ .

٥ — ٤ — ܐܕܫܐ ܕܦܪܕܐ ܠܝܬ ܣܒܘܡܐ ܐܝܬܝܐ :

ܘܡܬܢܝܪܠܡ ܕܦܪܕܐ ܥܠܘܗܝ ܚܕܐ ܡܥܠܬܐ ܕܡܫܘܚܘܬܐ ܐܘܪܓܢܝܬܐ . ܘܦܠܠܘܬܐ ܒܡܫܢܝܬܐ . ܐܝܟ ܕܡܬܚܠܦ ܠܗܘܪܡܘܢܐ ܠܡܠܘܐܐ ܦܪܝܫܐ ܕܠܒܠܒ ܠܡܠܘܬܐ ܘܡܦܠܚܬܐ ܒܝܕ ܒܘܪܬܐ . ܐܦ ܒܕܥܠܡ ܕܦܪܕܐ ܒܣܒܡܐ ܣܝܘܬܐ . ܟܪܐ ܠܗ ܒܘܪܬܐ ܘܠܗ ܐܣܪܐ ܠܦܪܢܣܗ . ܘܡܩܝܡ ܠܦܪܕܐ ܕܦܪܕܐ ܒܪܢܐ . ܠܒܪ ܠܗ ܒܠܒܗ ܗܘܒܐ ܣܘܓܐܐ ܒܐܡܚܡܐ ܒܠܢܝܐ ܐܘ ܡܢܘܢܐ . ܒܒܘܡ ܡܢ ܒܒܪܢܝܬܐ ܘܐܡܘܠܝܬܐ . ܐܝܟ ܕܥܠܘܗܝ ܦܪܝܫܐ ܒܫܒܬܗ ܥܠ ܦܪܕܐ ܠܘܢܐ . ܘܡܢ ܐܝܟ ܠܘܦܩܐ ܕܐܬܐ ܗܢܐ ܒܝܕܥ ܥܠ ܐܕܫܐ ܡܬܚܠܦܐ ܡܢ ܦܪܕܐ ܠܝܬ ܚܕ ܡܢܝܢܐ ܡܢ ܣܝܘܬܐ . ܘܒܐܘܪܚܐ ܕܒܪܢܝܬܐ ܕܦܪܕܐ ܒܪܢܐ ܒܕܘܟܐ ܕܦܪܕܐ ܠܘܢܐ . ܒܒܪܢܐ ܕܠܘܦܐ ܕܣܝܘܐ .

٥ — ٤ — ١ — ܦܪܕܐ ܠܗ ܒܒܪܢܝܬܐ :

ܒܪ ܗܘܪܐ ܕܪܘܚܬܐ ܗܘܪܡܘܢܝܬܐ . ܒܡܫܘܚܘܬܐ ܕܐܝܠܬܐ ܒܘܪܢܝܬܐ (ܒܠܒܢܝܬܐ) . ܒܐܡܚܡܐ ܕܡܕܝܢ ܒܘܡܘܗ ܠܐܡܕܐ . ܒܒܡܥ ܪܘܚܬܐ ܠܡܕܘܐ ܕܒܘܪܬܐ . ܘܪܣܝܒ ܙܘܓ ܡܢܝܢܘܗܝ . ܘܒܐܘܪܚܗ ܡܪܒܝܢ ܡܢܝܢܗ ܠܗܘܡܐ ܘܒܘܪܐ ܠܒܝܬܐ . ܦܝܫܐ ܡܢܐ ܡܬܘܡܘܗ ܠܗܘܡܘܢܝܬܐ

ܬܪܥܝܬܐ (ܠܝܣܘܣܘܡ)، ܐܝܟ ܚܕܐ ܦܘܠܚܢܐ ܚܣܝܐ ܡܪܘܪܒܢܐ ܐܠܗܝܪܘܢܝܐ ܐܝܟ ܠܡܡܣܝܢܘܬܐ ܬܪܥܝܬܐ ܒܪܘܫܡܬܐ ܘܪܝܫ ܠܗ̈ܘܢ ܣܝܒܪܬܗ ܡܢ ܐܢܙܝܡܐ ܡܦܪܫܢܐ.

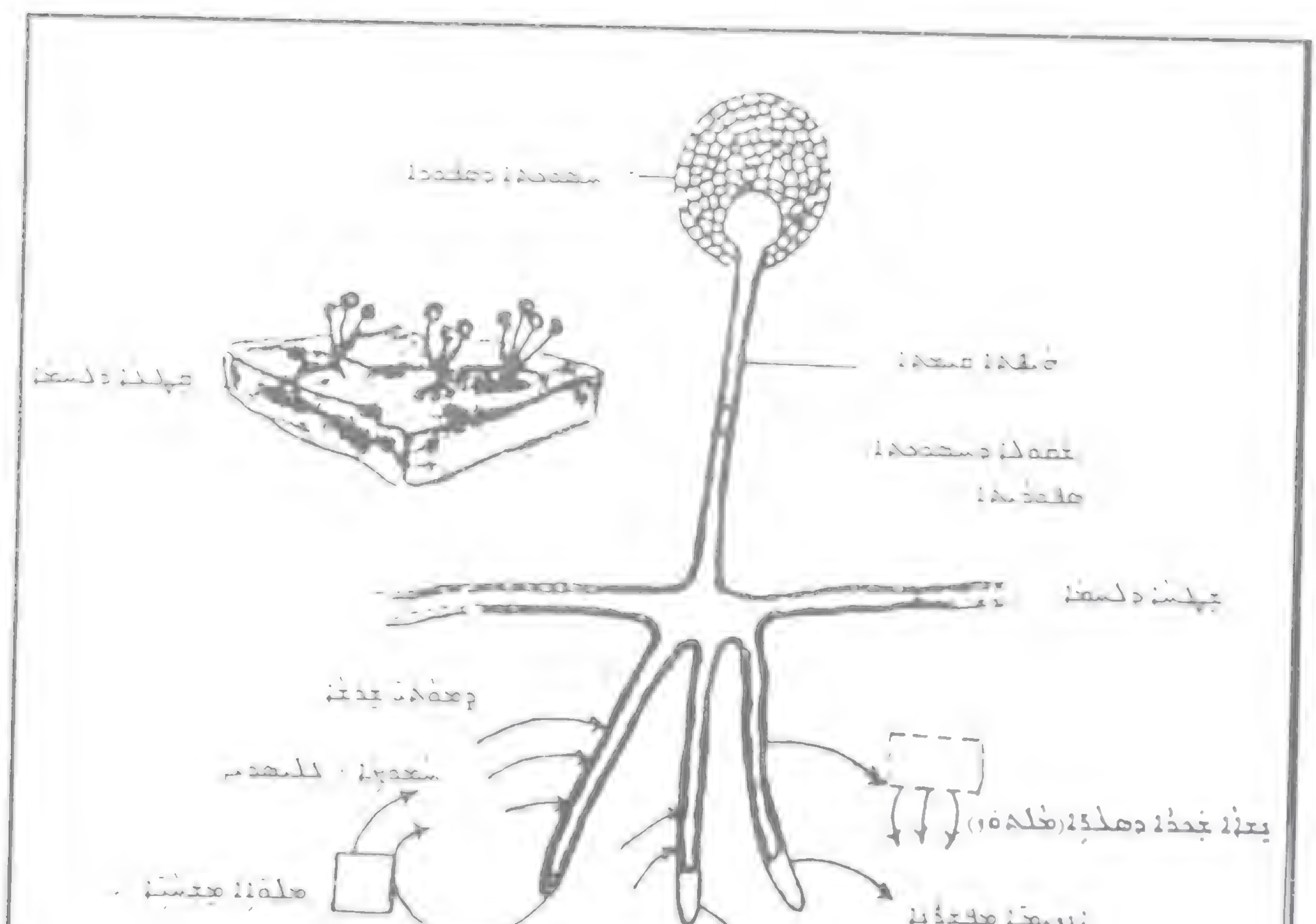
ܡܫܠܡܝܢ ܗܕܐ ܒܗܘܪܡܐ ܒܡܒܒܪܢܘܬܐ ܒܝܕ ܐܢܙܝܡܐ ܠܡܫܠܡܘܬܐ ܒܝܢ ܦܠܓܐ، ܡܛܠ ܚܝܕܬܐ ܠܡܫܘܦܠܝܢ، ܘܦܪܘܫ ܒܘܪܟܐ ܐܘ ܚܒܪܐ ܡܢ ܬܪܥܝܬܐ ܕܡܫܠܡܘܬܐ ܠܐ ܡܦܘܬܪܐ. ܐܘ ܠܐ ܦܠܓܐ: ܒܡܬܪܥܝܬܐ ܕܪܘܫܡܬܐ ܡܢ ܡܪܘܢܐ ܒܗܘܪܡܐ، ܘܒܒܠܥܬܗ ܒܫܠܡܐ ܦܠܘܚܐ، ܘܦܠܚܬܗ ܠܒܪܐ، ܒܕ ܡܪܦܘܝܐ ܠܣܝܒܪܬܗ ܠܗ ܡܢܝܢܐ ܒܪܐ. ܐܝܟ ܐܢܙܝܡ ܡܢ ܦܠܓܐ. ܟܠܗ ܚܕ ܠܗܘܦܟܐ ܠܦܠܓܐ ܠܗܘܢ، ܘܦܠܓܐ ܟܠܗ ܡܬܒܩܝܐ ܒܦܠܓܐ ܒܠܒܢܐ (Endocytosis)، ܐܝܟ ܡܦܘܬܪܐ ܒܡܫܠܡܢܘܬܐ ܦܪܘܫܢܝܬܐ ܘܡܫܠܡ ܘܡܪܒܢܝܬܐ، ܘܟܠܗ ܡܢ ܦܠܓܐ ܕܝܬܝܪܐ. ܐܝܟ ܨܘܪܬܐ (١ ـ ١٦).



ܨܘܪܬܐ (١ ـ ١٦) ܡܫܘܚܬܐ ܠܦܠܓܐ ܠܗܘܢ

٥ — ٤ — ٢ ܦܛܪܐ ܝܢ ܦܘܩܢ̈ܐ ܕܠܚܡܐ :

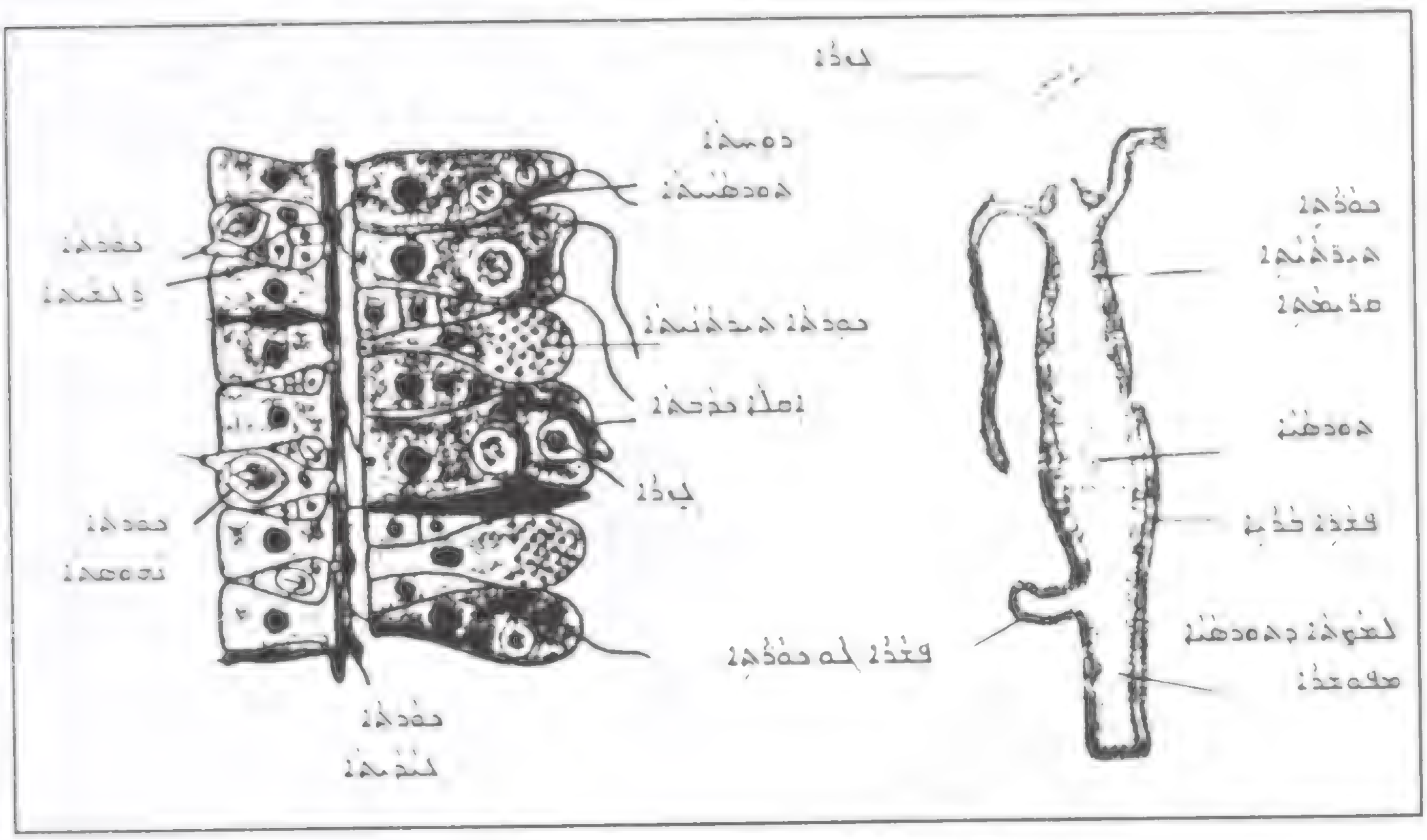
ܦܘܩܢ̈ܐ ܕܠܚܡܐ ܝܠܗ ܡܢ ܦܛܘܪ̈ܝܬܐ ܕܡܫܘܬܦܢܝܬܐ. ܗܘ ܕܫܚܝܐ ܥܠ ܡܠܘܐܐ ܗܘܘܢܐ. ܘܦܪܝܫܝܐ ܠܚܡܐ ܡܢܝܚܐ، ܗܘ ܕܡܫܘܬܦܐ ܝܠܗ ܒܥܘܬܗ ܡܢ ܝܬܪܐ (ܠܐ ܚܝܐ) ܗܘܝ ܡܬܪܘܣܝܬܐ ܕܝܬܪܐ ܐܘܪܓܢܝܬܐ، ܘܠܐ ܡܪܟܒܬܐ. ܘܠܐ ܡܨܝܐ ܦܘܩܢܐ ܡܢ ܠܡܬܚܘ. ܐ̈ܠܐ ܩܐܡ ܡܫܘܫܛܐ، ܘܡܫܠܡܘܗܝ ܠܡܬܪܘܣܝܬܐ ܚܕܡܐ ܦܬܝܠܬܐ ܘܡܪܟܒܬܐ. ܘܥܠ ܕܐܝܬ ܐܘ ܣܓܝ ܦܛܘܪ̈ܝܬܐ ܒܩܦܬܐ ܕܐܝܬܝܗ ܡܦܪܫܬܐ ܥܠ ܠܚܡܐ ܠܦܛܪܐ ܕܝܬܪܐ ܘܚܕܬܐ ܕܐܪܥܐ ܕܗܘܕܫܐ ܘܡܫܠܡܘܗܝ ܠܡܠܘܐܐ ܦܬܝܠܬܐ ܦܬܝܠܬܐ ܡܢܝܢܐ ܝܠܗ ܠܡܬܚܘ ܡܢ ܐܘ ܥܬܝܩܐ ܕܠܘܚܡܐ ܕܦܛܘܪ̈ܝܬܐ. ܘܚܕ ܦܛܪܐ ܕܗܘܕܫܐ ܐܘ ܦܘܩܢܐ ܕܠܚܡܐ ܚܕܐ ܚܕܐ ܕܠܘܚܡܐ. ܥܠ ܕܐܝܬ ܗܘ ܝܠܗ ܦܛܪܐ ܚܕܬܐ. ܐܝܟ ܒܨܘܪܬܐ (١ - ١٧).



ܨܘܪܬܐ (١ - ١٧) ܡܚܘܘܝܐ ܠܦܛܪܐ ܚܕܬܐ

٥ – ٤ – ٣ – ܦܬܪ̈ܐ ܠܐ ܓܡܝܪ̈ܐ :

ܗܕܐ ܕܪܫܡܐ ܕܓܡܝܪܐ ܠܝܬܘܗܝ . ܒܡܝܬܝܘܬܐ ܕܒܘܪܬܐ ܢܗܘܫܢܝܬܐ ܒܗܘܪܫܐ ܕܦܘܡܐ ܠܝܬ ܗ̇ܘ ܕܘܫܬܐ . ܡܛܠ ܒܘܪܬܐ ܡܬܪܒܝܢܝܬܐ ܡܢܝܫܐ ܠܕܘܫܬܐ ܐܣܛܘܡܟܬܐ ܡܬܝܢܬܐ . ܒܪܦܬܐ ܕܐܢܘܫܐ ܡܦܪܢܣܐ . ܡܕܡܝܢ ܒܕܘܟܬܗ ܠܐܢܘܫܐ ܡܦܪܢܣܐ . ܡܕܡܝܢ ܒܕܘܟܬܗ ܠܐܢܘܫܐ ܕܡܬܦܫܝܢ . ܢܕܝܠܐ ܠܐ ܒܗܘܢܐ ܦܬܪ̈ܐ ܠܫܘܬܐ ܦܡܬܪܢܝܬܐ . ܦܠܚ ܐܢܐ ܐܢܘܫܐ ܟܠ ܡܦܠܓܬܐ ܕܦܪܘܬܢܝܬܐ ܠܝܒܠܢܝܬܐ ܡܢ ܢܡܘܣܐ ܐܡܝܢܐ . ܡܣܘܡܘܗܝ ܡܟܝܢܢ ܦܦܬܝܪܐ . ܘܟܝܡ ܐܝܟ ܗܢܐ ܦܪܢ ܡܟܘܪܘܬܐ ܕܦܬܪ̈ܐ ܒܪܢܐ .



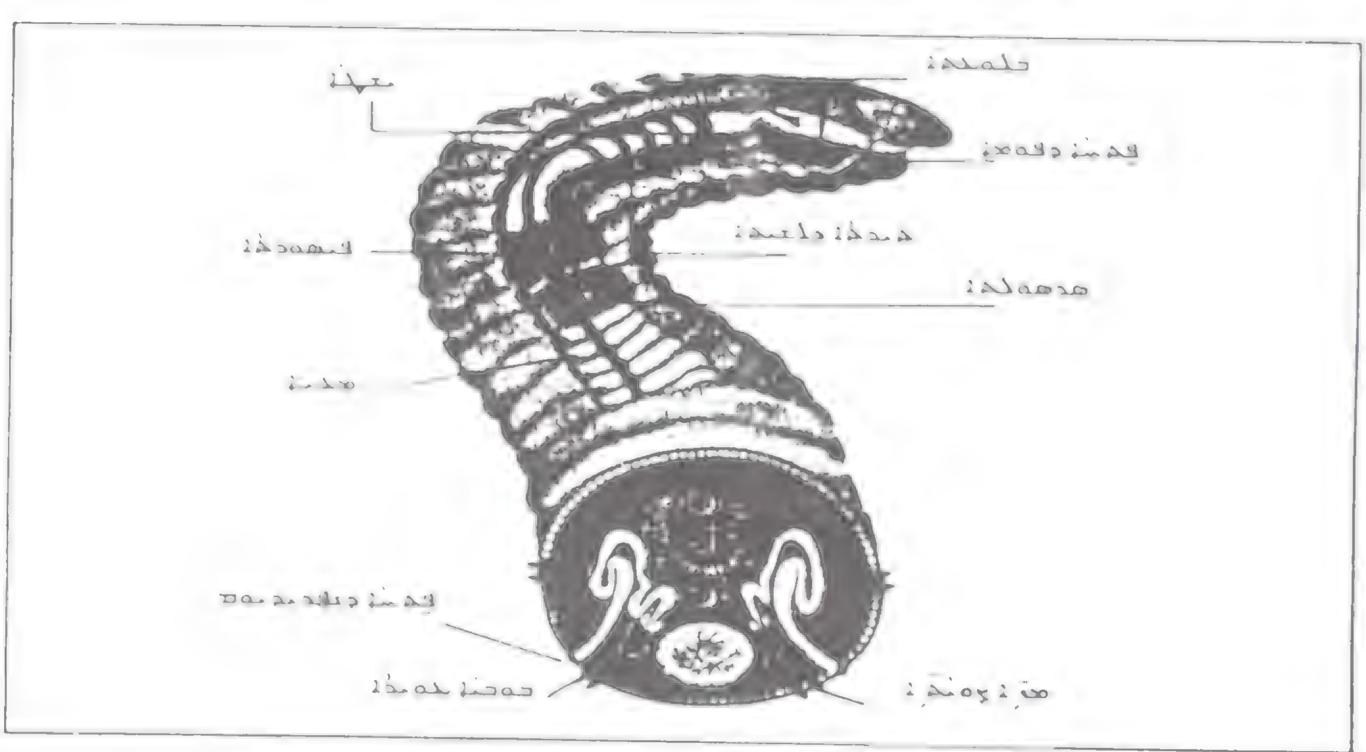
ܨܘܪܬܐ (١ - ١٨) ܡܬܚܙܝܢܘܬܐ ܕܦܬܪ̈ܐ ܠܐ ܓܡܝܪ̈ܐ

ܐܝܟ ܡܟܘܪܘܬܐ ܕܦܬܪ̈ܐ ܠܗܢܐ . ܡܛܠ ܕܒܪܫܡܐ ܕܝܒܪܐ ܒܗܘܪܫܐ ܕܐܟܠܬܐ ܒܘܪܬܢܝܬܐ (ܒܠܒܝܬܐ) . ܗ̇ܝ ܕܡܬܠܐ ܡܢ ܡܕܝܢ ܡܣܘܡܘܬܐ ܠܒܪܬܢܝܬܐ . ܘܡܛܠ ܒܗܢܐ ܐܘܪܫܐ ܢܕܡܫܐ ܒܘܪܬܐ ܕܒܪܡܝܬܐ ܐܣܛܘܡܟܬܐ . ܒܡܝܬܝܘܬܐ ܒܝܕ ܡܣܝܒܪܘܬܗ ܠܐܝܠܐ ܒܪܒܝܬܐ . ܘܡܬܪܟܝܬܐ ܕܕܘܫܬܐ ܒܘܪܬܢܝܬܐ . ܨܘܪܬܐ (١ - ١٨) . ܦܠܚ ܡܦܘܪܫܐ ܡܠܘܐܐ ܒܘܪܬܢܝܐ ܠܗ ܕܘܫܬܐ . ܒܝܕ ܠܡܣܦܘܫܬܐ ܕܒܪܫܬܐ (ܐܣܦܘܣܦܘܪܝܬܐ) . ܘܦܪܝܢܝܢ ܦܪܘܬܢܝܬܐ ܘܡܬܢܚܐ . ܦܪܢ ܐܝܟ ܒܘܪܬܐ

ܡܢ ܡܠܘܐܐ ܠܐ ܡܩܘܒܠܐ ܒܪܦܪܦܝܢ ܠܪܘܚܐ ܐܣܛܘܡܟܐ ܡܪܢܝܬܐ. ܘܡܢܗ ܦܢܝܢ ܡܪܘܦܝܐ ܒܥܘܪܢܐ ܕܦܘܡܐ. ܪܘܚܐ ܡܢ ܠܘܥܡܥܝܢ. ܡܢ ܡܢܐ ܕܡܕܝܡ ܡܚܘܝܐ ܡܠܗ ܕܦܬܪܐ ܠܗ ܗܝܕܪܐ. ܡܦܠܝܢ ܠܗܪܝܢ ܐܕܝܐ ܟܪܬܐ ܘܠܗܘܢ ܢܦܡ ܚܕܕܐ.

٥ ـ ٤ ـ ٤ ـ ܦܓܪܐ ܠܗ ܬܘܠܥܬܐ ܕܐܪܥܐ :

ܦܝܫ ܥܡܝܠܐ ܦܓܪܐ ܠܗ ܬܘܠܥܬܐ ܕܐܪܥܐ. ܠܗܘܦܟ ܠܦܓܪܐ ܟܪܐ. ܘܦܝܫܬܐ ܡܠܗ ܣܘܝܬܐ ܕܐܘܗ ܐܕܝܐ ܡܢ ܦܓܪܐ ܕܟܪܐ ܠܗܘܐ ܠܗܝܐ ܠܗ ܐܝܬܘܬܐ ܕܫܝܢ ܒܘܪܟܐ ܦܓܪܐ ܦܪܝܟܐ ܠܦܝܫܬܐ ܕܠܝܬܐ ܠܥܡܠܐ ܕܗܘܪܫܐ. ܐܘ ܡܦܫܬܗ ܐܘ ܠܪܦܫܬܐ ܕܐܝܘܝܬܐ. ܐܘ ܠܠܡܝܘܬܐ ܘܦܩܝܬܐ ܕܝܕܥܬܐ. ܘܠܗ ܬܘܠܥܬܐ ܕܐܪܥܐ. ܡܬܦܫܝܢ ܣܠܝܠܘܬܐ ܕܦܘܡܐ ܘܟܠܘܟܬܐ ܠܘܡܟܪܟܢܟܬܐ ܘܝܥܒܬܐ. ܦܝܫܬܐ ܕܥܡܠܬܐ ܕܗܘܪܫܐ. ܐܝܟܐ ܦܫܘܪܬܐ ܡܪܬܐ ܡܪܘܝܐ ܪܡܝܐ. ܡܠܗ ܟܪܡܘܟܐ ܦܝܫܬܐ ܕܡܘܦܫܐ ܕܗܘܪܫܐ. ܘܐܦ ܠܫܕ ܡܗܫܐ ܝܕܥܐ. ܟܪܬܗ ܪܫܝܥ ܠܘܪܫܐ ܠܓܗ ܦܫܘܪܬܐ ܡܪܬܐ ܡܪܘܝܐ ܠܘܡܟܪܟܢܝܐ ܣܠܝܡܐ. ܐܝܟ ܕܫܝܢܝܐ ܡܢܐ ܢܓܠ ܝܬܪܐ ܕܪܡܠܐ ܠܗ ܣܠܝܠܘܬܗ. ܘܡܦܠܝܫܐ ܠܗܘ ܟܫܝܬܐ ܕܡܠܘܐܐ ܠܘܡܟܪܟܢܝܐ ܠܝܬܪܐ ܘܟܗܪܐ. ܟܠܟ ܟܘܟܢܐ ܦܓܪܐ ܟܡܟܝܐ. ܘܡܠܝܢ ܐܟܘܟ ܐܨܛܠܐ. ܐܪܝܟܐ ܡܪܬܐ ܡܪܘܝܐ ܪܡܝܐ. ܟܢܝܠ ܡܢ ܬܘܠܠܝܗ ܝܪܢܐ. ܘܦܝܫ ܡܥܘܡܗ ܝܦܬܐ ܠܘܡܪܬܐ (Typhlosole)، ܡܘܝܕ ܡܢ ܡܥܘܡܫܬܐ ܕܝܥܒܫܐ ܡܦܫܪܐ ܘܠܡܘܙܐ. ܐܨܛܠܐ (١ - ١٩).



ܐܨܛܠܐ (١ - ١٩) ܐܘܪܓܢܘܢ ܦܓܪܐ ܠܗ ܬܘܠܥܬܐ ܕܐܪܥܐ.

ܡܕܪ̈ܫܬܐ ܬܘܠܡܝ̈ܕܐ ܥܠ ܡܠܘܐܐ ܗܕܪ̈ܫܐ ܕܐܝܬ ܠܗ ܥܘܕܪܐ، ܠܗ ܗܟܢܘܬܐ ܕܫܦܪܬܐ ܕܚܠܠܗ، ܘܪ̈ܦܐ ܠܡܫܡܫܘܬܐ ܥܠ ܬܚܘܬ. ܘܗܕܝܐ ܡܛܐܠܒ ܗܘܠܦܢܐ ܕܐܪܟܐ، ܚܕ ܠܐܪܐ ܐܢܫ̈ܐ ܒܡܠܦܢܐ ܘܦܪܘܫܬܐ ܕܥܘܪܐ، ܘܡܕܪ̈ܫܬܐ ܗܘܠܦܢܐ ܟܠܠܐ، ܕܠܗ ܥܕܢܐ ܕܟܢܫܘܬܗ، ܒܦܠܚܬܐ ܡܢ ܡܟܡܪܗ، ܘܠܡܠܚܬܐ ܕܢܚܪܐ ܕܚܪ̈ܦܐ ܢܩܛܢܐ ܒܢܝܢܐ. ܘܡܪܟܒܐ ܕܝܡܘܪܐ ܫܘܬܦܐ، ܟܠܡܫܘܕܥ ܠܓܘ ܟܠܘܢܐ. ܦܝܫ ܡܘܕܝܐ ܗܘܪܫܐ ܠܗ ܟܠܘܢܐ ܒܪܦܢܐ ܕܗܝܪܬܐ ܟܠܘܢܝܬܐ، ܡܕܡ ܥܟܪܗ ܡܢ ܐܘ ܢܬܝܓܐ ܠܦܫܘܪܬܐ.

ܘܡܢ ܗܝܪܬܐ ܟܠܥܢܬܐ ܕܐܝܬ ܒܡܪ̈ܘܢܐ ܕܢܬܝܓܐ، ܦܝܫ ܡܘܝܕܐ ܪܦܢܐ ܠܡܫܘܢܝܘܬܐ ܕܫܡܘܝܐ ܕܐܝܬ، ܐܘ ܐܝܬ ܕܒܕܝܐ ܢܝܐ ܠܗ ܗܘܪܫܢܐ، ܘܪܝܪ ܦܠܚܬܐ ܕܗܘܪܫܢܐ ܡܢ ܗܪܫܘܠܬܐ. ܦܝܫ ܡܘܡܟܪܐ ܒܡܢܐܝܬ ܠܗ ܡܢܝܢܐ. ܒܡܫܟܚܘܬܐ ܕܐܢܘܝܫܐ ܡܦܟܪܢܐ. ܐܝܟ ܗܠܝܢܝ ܠܦܟܪܬܐ ܕܗܠܝܢܝ ܘܐܢܘܝܫܐ ܡܦܟܪܢܐ ܠܦܪܘܗܢܝܬܐ ܘܡܝܟܝܐ. ܦܝܫ ܠܡܒܝܢ ܦܠܚܐ ܕܦܟܪܐ ܡܢ ܚܠܝܠܘܬܐ ܕܡܢܝܢܐ. ܒܡܫܟܚܘܬܐ ܕܟܘܪܬܐ ܡܪܝܡܐ ܠܡܪܘܝܚܐ. ܘܡܬܒܝܢ ܠܟܘܪܬܐ ܕܠܡܡܠܐ ܒܡܫܟܚܘܬܐ ܕܝܡܐ.

٥ — ٤ — ٥ - ܦܟܪܐ ܠܗ ܦܪܕܣܝܬܐ :

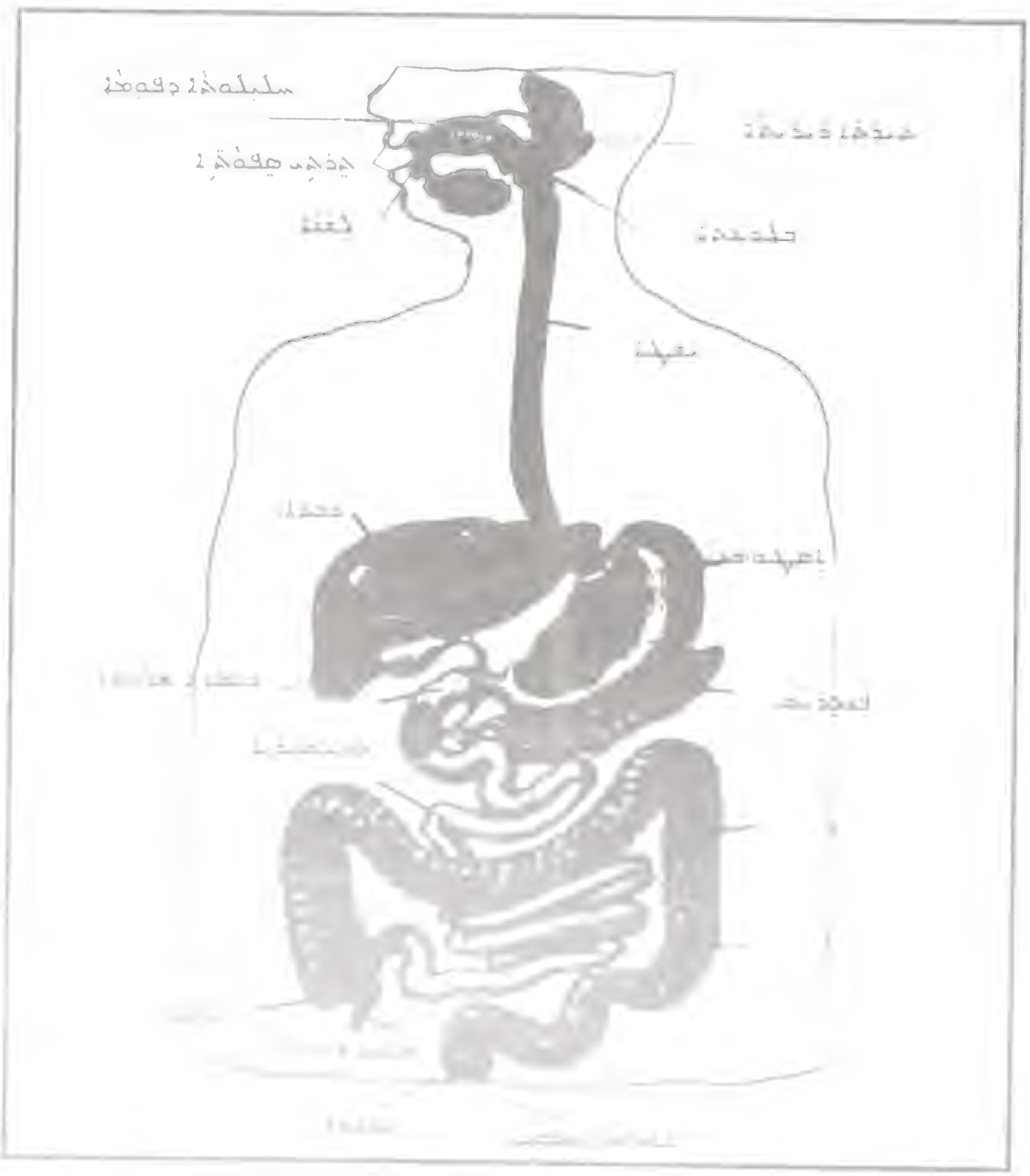
ܦܝܫ ܥܡܝܠܐ ܦܟܪܐ ܠܗ ܒܪܢܫܐ ܚܕ ܛܘܦܣܐ ܠܦܟܪܐ ܒܚܘܫܬܐ ܦܪܕܣܝܬܐ ܚܠܝܢܝܬܐ. ܘܗܘ ܝܠܗ ܚܕ ܛܘܦܣܐ ܐܚܪܢܐ ܥܠ ܦܟܪܐ ܒܪܢܫܐ. ܒܝ ܡܡܛܝܐ ܡܢ ܛܘܦܣܐ ܩܡܝܐ، ܗܘ ܕܫܥܠܠܗ ܠܦܟܪܐ ܠܗ ܗܘܠܦܢܐ ܕܐܪܟܐ. ܘܫܥܒܕ ܗܡܟܪܢܘܬܐ ܕܦܟܪܐ ܠܗ ܒܪܢܫܐ ܘܚܠܝܢܝܬܐ ܐܚܪܝܬܐ، ܘܥܠ ܦܝܫܬܐ ܡܡܫܟܢܬܐ ܡܢ ܒܘܝܐ ܦܟܪܢܐ. ܘܝܠܗ ܡܡܫܟܝܢܐ ܚܠܝܠܘܬܐ ܦܘܫܩܐ ܘܐܫܛܘܡܘܬܐ ܘܡܢܝܢܐ ܩܡܝܐ. ܐܫܟܚܬܐ (١ - ٢).

ܐ . ܦܟܪܐ ܠܗ ܚܠܝܠܘܬܐ ܦܘܫܩܐ :

ܘܦܝܫܐ ܝܠܗ ܡܫܘܡܫܐ ܐܦ ܒܦܟܪܐ ܕܪܝܫܐ، ܘܫܢܝ ܠܠܫܢܐ ܕܗܘܪܫܢܐ ܠܗ ܚܠܝܠܘܬܐ ܦܘܫܩܐ ܟܠܗ. ܘܡܬܝܕܥ ܒܪܝܫܐ ܕܡܪܦܝܠܗ ܗܠܝܐ ܝܘܡܐ ܡܢ ܗܝܪܬܐ ܕܪܝܫܐ (ܫܘܒܪܢܝܬܐ ܘܗܫܘܡ ܠܝܬܢܝܬܐ ܘܗܫܘܡ ܦܫܝܛܐ) ܡܢ ܠܗ ܛܘܦܣܐ ܕܠܐܢܫܐ ܒܢܝܫ، ܦܗܫ ܠܗ ܦܘܫܩܐ.

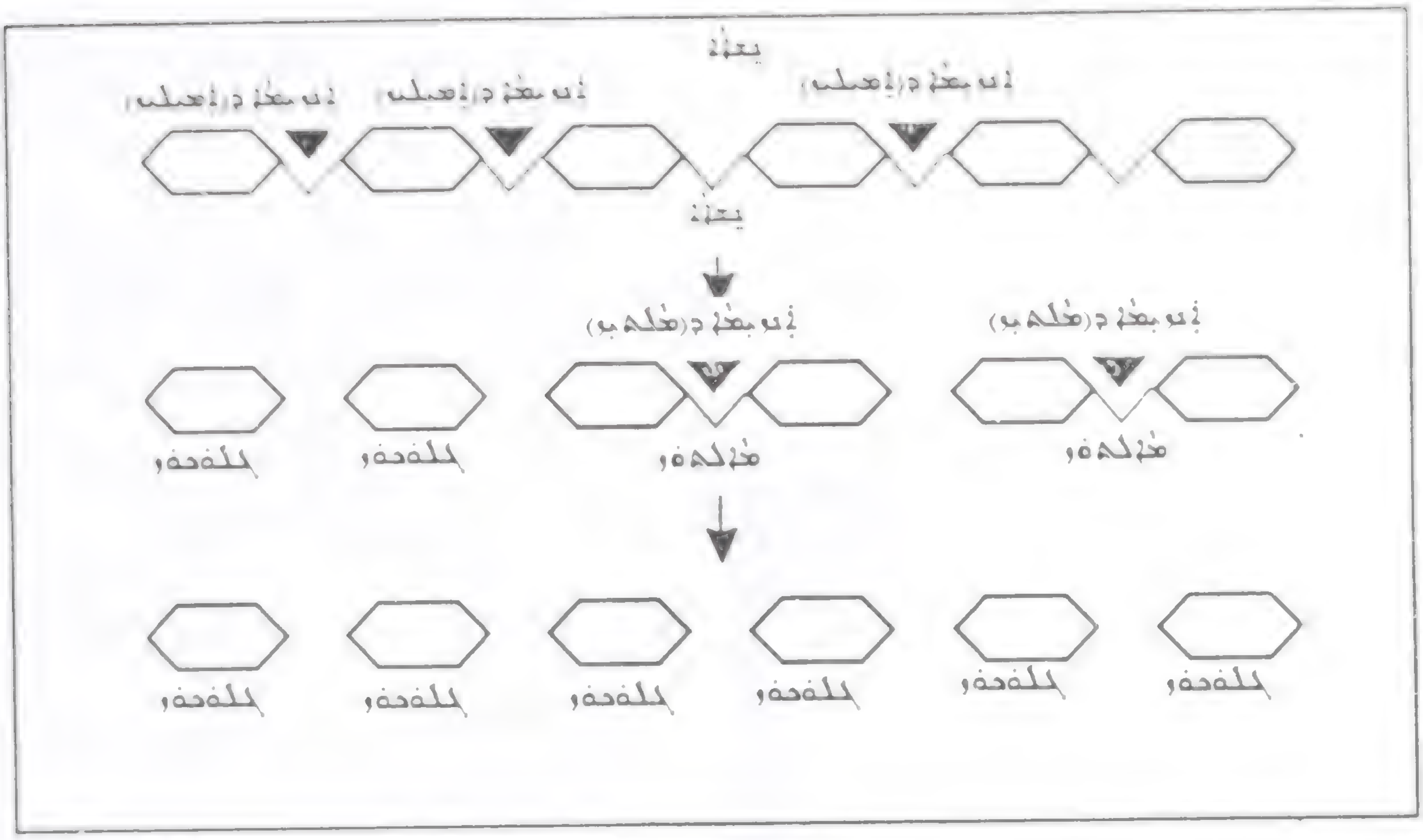
ܕܡܕܐ ܒܠܗ ܚܕ ܡܠܘܐܐ ܝܣܠܢܐ ܡܫܘܕܥܐ ܡܢ ܦܢܐ ܡܕܡܕܐ ܠܘܩܒܠ ܡܠܘܐܐ ܡܫܘܚܬܐ . ܘܡܠܝܐ ܠܐ ܗܕܡܝܐ . ܘܡܕܡܕܐ ܐܢܫܝܐ ܐܝܟ ܐܝܠܝܢ ܕܩܝܕܐ (ܠܐܠܝܢ) ܘܡܠܝܠ ܡܢ ܦܠܓܗ . ܡܠܦܐ ܕܦܢܝܐ ܕܩܝܕܐ ܠܬܫܘܠܐ ܡܣܝܒܐ . ܡܝܢܗ ܦܩܕܢܘܬܐ ܡܣܬܢܝܐ ܕܗܘܕܩܐ . ܒܠ ܡܫܡܠܝܢܘܬܐ ܕܥܒܕܬܐ ܦܕܝܫܐ ܠܗ ܘܫܘܕܐ ܡܕܝܢܬܐ ܠܣܠܝܠܘܬܐ ܕܦܘܡܐ . ܕܥܠܝܐ ܕܠܥܣܐ . ܘܠܗܕܐ ܕܥܒܕܐ ܕܡܕܚܬܐ ܘܣܘܡܐ ، ܘܐܦ ܠܫܡܥܬܐ ܒܗܘܕܩܐ .

ܦܩܠ ܐܡܝܢܐ ܕܡܕܐ . ܒܦܥܕܬܐ ܕܣܕܐ ܦܣܩܘܬܐ ܡܫܘܚܬܐ ܡܢ ܝܥܐ . ܠܗ ܣܠܝܠܘܬܐ ܕܦܘܡܐ . ܘܥܕܕ ܒܠܥܣܬܐ ܕܡܩܠ ܘܡܬܠܚܡ ܠܐܘܬܘܡܫܐ ܒܚܕ ܡܫܢܐ ܚܘܕܐ . ܡܫܠܡ ܝܥܐ ܡܘܥܕܐ . ܠܥܕܕܐ ܗܕܢܐ . ܒܠܗ ܥܕܕܐ ܕܗܠܕܐ (ܦܠܓܗܘ) . ܗܘ ܕܦܥܬܐ ܡܘܠܥܕܬܐ ܦܥܕܗ ܠܥܕܕܐ ܣܕܢܐ . ܒܠܗ ܥܕܕܐ ܕܒܥܝܬܐ (ܒܠܦܘܦܘ) ، ܒܡ ܥܕܢܬܐ ܕܝܥܬܐ ، ܠܗ ܦܢܝܐ ܕܡܝܩܐ (ܐܫܟܠܐ ١ ـ ٢١) .



ܥܕܢܬܐ ܠܗ ܦܥܕܐ ܗܕܡܐ (٢٠ ـ ١) ܐܫܟܠܐ

ܡܫܘܕܥܐ ܗܠܝܢ ܢܒܪܐ ܡܢ ܚܕ ܡܢܝܢܐ ܠܡܘܬܪܐ ܡܢ ܫܟܪ̈ܐ ܣܓܝܐ̈ܐ (
ܓܠܘܩܘܙ) . ܐܡܝܠܐܙ ܕܪܘܩܐ ܘܦܢܩܪܝܐܣ ܡܦܪܩܝܢ ܐܣܘܪ̈ܐ ܥܡ
ܡܢܘܢܝܬܐ ܕܓܠܘܩܘܙ . ܟܕ ܡܦܠܓܝܢ ܚܡܝܪܐ ܦܠܝܠܬܐ ܡܢ ܡܢܘܢܝܬܐ
ܕܓܠܘܩܘܙ ܣܓܝܐ . ܘܚܡܝܪܬܐ ܒܝܢ ܬܪܬܝܢ ܡܢ ܡܢܘܢܝܬܐ ܕܡܐܠܬܘܙ . ܒܬܪ
ܗܕܐ ܦܝܫ ܡܫܘܚܠܦܐ ܡܐܠܬܘܙ ܠܓܠܘܩܘܙ . ܒܡܨܥܝܘܬܐ ܕܐܣܘܪܐ
ܕܡܐܠܬܘܙ ، ܗܘ ܕܡܫܬܒܩ ܒܝܕ ܡܝ̈ܐ ܡܢܗ .



ܨܘܪܬܐ (١ - ٢١) ܦܘܪܫܐ ܕܡܝ̈ܐ ܠܫܟܪܐ ܣܓܝܐܐ

ܒ. ܦܘܪܫܐ ܕܦܪܘܬܝܢ̈ܐ :

ܘܐܦ ܦܘܪܫܐ ܗܢܘ ܡܫܘܡܗܐ ܦܘܪܫܐ ܕܦܪܘܬܝܢ̈ܐ . ܐܝܟ ܕܠܐ ܡܬܥܒܕܢܘܬܐ
ܕܚܠܒܐ ܕܦܪܘܬܝܢ̈ܐ ، ܗܝ ܕܡܫܬܒܩܐ ܡܠܘܐܐ ܡܢ ܚܒܪܘܬܐ
ܦܘܪܫܢܝܬܐ . ܦܘܪܫܐ ܗܢܐ ܡܫܘܡܗ ܠܘ ܟܪܝܟܐ ܒܠܚܘܕ ܡܠܘܐܐ ܚܒܪܘܬܐ
ܦܪܫ ܐܢܐ ܚܒܪܘܬܐ ܠܘ ܡܪܘܒܐ ܕܦܪܘܬܝܢ̈ܐ ، ܘܪܦܐ ܒܪܘܪܐ ܡܫܘܚܠܦܐ
ܕܐܝܢܘܠܘܓܝܐ . ܘܗܟܢ ܐܣܘܪܐ ܕܦܘܠܝܦܦܛܝܕ ܘܦܘܪܫܐ ܠܐ ܡܬܚܒܪܝܢ
ܥܡ ܡܠܘܐܐ ܡܫܘܚܠܦܐ .

ܡܬܥܒܕܐ ܦܠܓܐ ܦܪܘܬܝܢ̈ܐ ܒܐܢܙܝܡ̈ܐ ܠܦܪܫܐ ܐܝܟ ܡܢܫܐ
ܘܣܘܡܐ ܘܡܫܘܚܠܦܐ ܒܡܘܪܟܐ . ܐܦ ܡܬܥܒܕܐ ܒܐܢܙܝܡ̈ܐ ܘܦܘܪܫܢܐ .

ܘܒܝܕܥܬܐ ܕܡܬܒܪܬܐ ܕܗܘܪܡܢܐ ܒܚܘܪܬܐ ܕܡܪܘܪܐ ܕܐܣܛܘܡܟܐ . ܡܪܟܒ ܐܢܐ ܚܘܪܬܐ ܡܠܘܐܐ ܕܓܣܛܪܝܢ (ܐܣܛܘܡܟܝܐ) . ܘܗܘ ܝܠܗ ܚܕ ܗܘܪܡܘܢܐ ܕܦܝܫ ܛܠܒܢܐ ܒܡܝܟܢܘܬܐ ܕܓܘ ܠܒܢܝܢܐ ܕܦܠܚܐ . ܘܒܝܕܥܬܐ ܕܡܛܠܬܗ ܒܐܘܪܚܐ ܕܓܘܐ ܠܚܘܪܬܐ ܕܗܒܪܢܬܐ ܦܪܫܬܐ . ܒܡܪܘܪܐ ܕܐܣܛܘܡܟܐ . ܘܡܛ ܠܗܘ ܠܪܦܬܐ ܕܒܝܪܬܐ ܐܣܛܘܡܟܝܬܐ .

ܘܦܘܫܟܬܐ ܠܗܕܘܪܘܬܐ ܕܦܬܪܐ ܐܘܪܚܬܐ ܓܘ ܐܣܛܘܡܟܐ . ܦܠܚܬܐ ܡܢ ܡܢܘܬܐ ܘܪܘܚܬܐ ܕܡܪܘܢܗ ܒܡܛܪܬܝܬܐ . ܬܪܝ ܦܫܘܛܐ ܕܦܬܪܐ ܒܝܡܢܐ ܕܓܒܬܐ ܡܢܐ :

ܐ ‑ ܦܝܫ ܚܡܘܨܐ ܕܗܝܕܪܘܟܠܘܪܝܟ . ܒܦܠܚܬܐ ܕܡܠܘܐܐ ܗܘܪܡܢܐ . ܘܡܒܛܠܬܐ ܕܗܕܝ ܐܢܙܝܡܐ ܕܒܝܟܡܝܘܬܝܢ ܘܦܪܘܝܢ . ܠܟܟܡܝܢ ܘܪܝܢ ܢܦܠܝܗ . ܘܡܦܪܬܐ ܠܐܢܐ ܗܕܝ ܐܢܙܝܡܐ ܚܕ ܡܝܢܐ ܚܡܘܨܐ ܒܝܕ ܦܘܦܫܢܐ ܠܗܘܠܚܢܝܗ .

ܒ ‑ ܡܦܝܫ ܐܢܙܝܡܐ ܕܦܦܫܝܢ ܒܦܠܚܘܬܐ ܕܦܪܘܛܝܢܐ ܠܡܢܬܘܢܬܐ ܒܝܕ ܦܥܝܠܘܬܐ ܝܠܝܗ ܦܦܬܘܢܬܐ .

ܓ ‑ ܚܒܪܐ ܡܦܝܫܬܐ ܓܘ ܐܣܛܘܡܟܐ ܕܡܛ ܓܘܪܢܝܬܐ ܝܠܐ ܐܢܙܝܡܐ ܕܒܝܡܘܫܝܢ (Chymosin) ܪܝܢ . ܗܘ ܕܒܪܐ ܠܚܫܝܢ ܠܦܪܚܫܝܢ . ܘܦܝܠ ܐܫܬܐ ܒܝܡ ܐܢܙܝܡܐ ܕܟܠܣܝܘܡ Ca . ܕܗܘܒܠ ܡܚܘܬܐ ܕܚܠܒܐ ܠܐ ܡܙܝܓܬܐ . ܘܠܒܗ ܒܝܡܘܫܝܢ ܓܘ ܐܣܛܘܡܟܐ ܕܒܪܢܫܐ . ܘܦܦܫܝܢ ܗܘ ܝܠܗ ܕܡܦܝܫ ܒܚܠܒܬܐ ܕܚܫܝܢ ܠܦܪܚܫܝܢ . ܘܐܗܐ ܝܠܗ ܦܫܛܬܐ ܡܕܡܝܬܐ . ܒܦܬܪܬܐ ܕܚܫܝܢ ܓܘ ܐܣܛܘܡܟܐ ܕܒܒܪܐ ܢܫܘܡܐ .

ܘܠܗܕܘܪܘܬܐ ܕܒܘܣܡܐ ܕܚܠܒܐ . ܐܝܬ ܡܘܬܪܢܐ ܠܗܕܘܪܐ ܕܚܠܒܐ . ܐܝܟ ܕܦܝܫܝ ܟܠ ܚܠܒܐ ܒܗܘܪܫܝܗ . ܡܛܠ ܡܚܘܬܐ ܦܬܐ ܠܐ ܡܨܝܐ ܒܝܕ ܐܪܒܥܐ ܓܘ ܐܣܛܘܡܟܐ . ܘܐܗܐ ܡܦܪܐ ܚܕܢܐ ܡܠܝܬܐ ܠܐܢܙܝܡܐ ܕܦܦܫܝܢ ܠܦܬܪܬܗ .

ܕ ‑ ܡܛܫܡܐ ܦܬܪܬܐ ܕܒܪܒܘܗܪܬܐ ܓܘ ܐܣܛܘܡܟܐ ܟܠ ܡܢ ܕܐܬܐ ܒܝܡ ܗܦܐ ܡܢ ܐܡܝܠܘ ܪܡܪܐ .

ܗ ـ ܟܠܐ ܦܘ̈ܠܚܐ ܡܢܗܪ̈ܢܐ ܠܡܥܝܐ. ܒܡܫܡܫܢܘܬܐ ܕܡܚܐ ܕܒܪܐ ܠܐܣܛܘܡܟܐ ܡܥܝܐ ܙܥܘܪܐ ܡܢ ܐܝܕܐ ܕܠܐܝܢ، ܒܡܫܩܠܢܘܬܐ ܕܒܪܡܫܐ ܠܗܘܢܐ.

ܕ ـ ܦܘ̈ܠܚܐ ܠܗ ܡܥܝܐ ܙܥܘܪܐ :

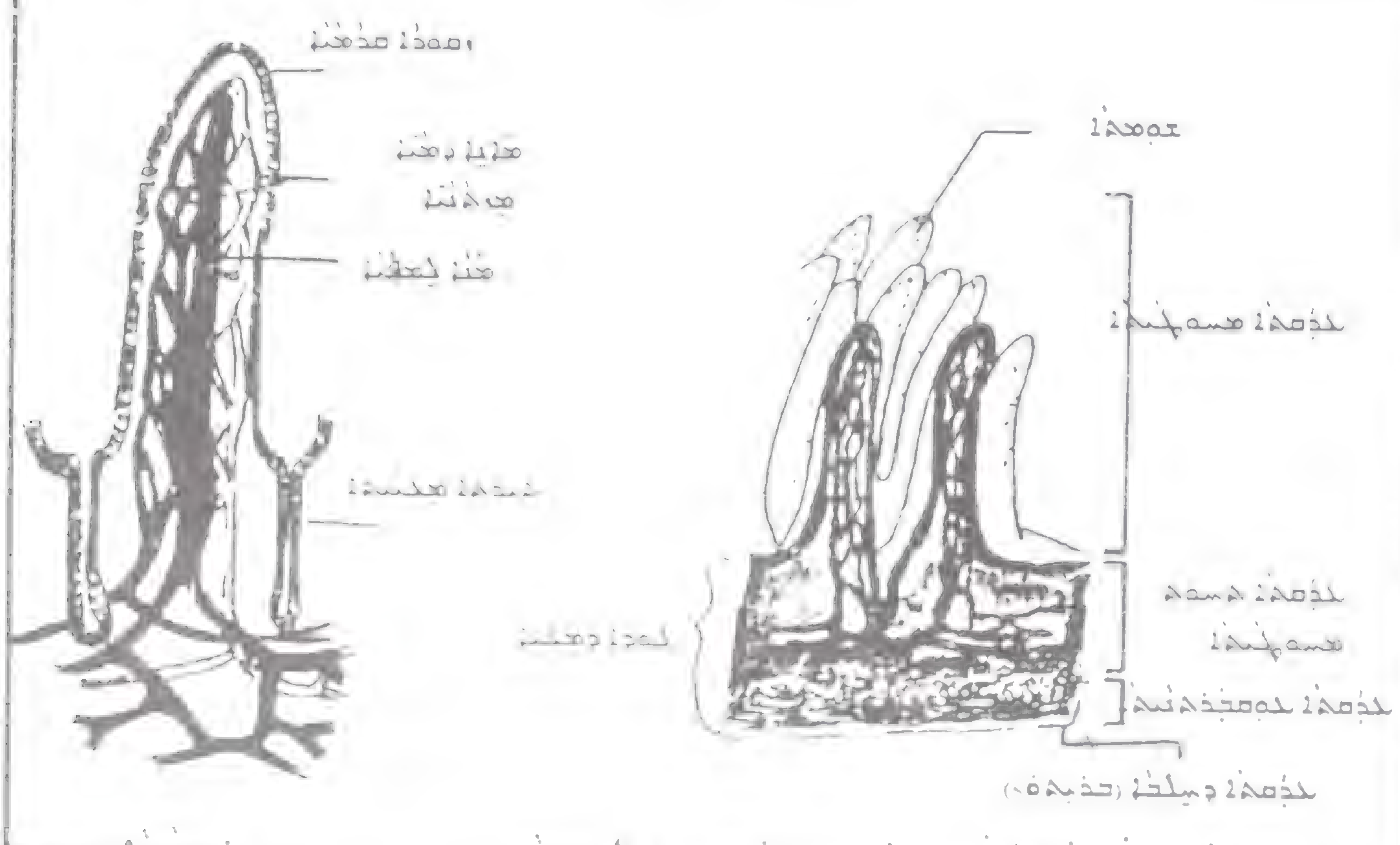
ܘܐܦ ܦܘ̈ܠܚܐ ܗܠܘ ܡܬܩܘܡܘܢ ܒܦܘ̈ܠܚܐ ܡܥܝ̈ܢܝܐ. ܘܒܗܘ ܠܡܥܒܕܐ ܦܘ̈ܠܚܐ ܕܡܠܘܐܐ ܗܘܕܡܝܐ ܒܗܘܡܢܐ ܡܕܡܢܐ ܡܢ ܡܥܝܐ ܙܥܘܪܐ ܡܛܠ̈ܢܐ ܒܐܣܛܘܡܟܐ، ܘܗܘ ܕܦܬܚܐ ܗܠܘ ܒܕܠܝܐ ܒܗܕܪܡܫܐ؛ ܘܡܬܦܠܓܝܢ ܒܡܫܡܫܢܘܬܐ ܕܦܬܚܐ ܡܥܝ̈ܢܝܐ ܗܠܝܢ ܐܪܒܥ ܡܢ ܣܛܪܐ ܒܠܚܘܕ :

١ ـ ܣܘܓܐܐ ܕܡܪܕܝܬܐ : ܡܠܘ ܡܢ ܪܦܝܬܐ ܕܒܩܕܐ. ܡܗܘܕܝܐ ܗܠܘ ܡܢ ܡܥܝܐ ܘܡܠܚܐ ܕܡܪܕܝܬܐ، ܘܙܘܥܠܢܐ ܕܡܪܕܝܬܐ ܘܡܘܠܚܡܐ ܕܘܠ. ܘܗܘ ܡܥܒܕܐ ܗܠܘ ܡܢ ܐܝܕܝܐ.

٢ ـ ܣܘܓܐܐ ܦܝܪܘܣܛܠܛܝܩܝܐ : ܘܪܦܝܐ ܠܗ ܡܚܕܪܐ ܕܦܝܪܘܣܛܐ، ܘܡܛܝܒ ܟܠ ܗܕܐ ܐܝܕܝܐ ܕܡܪܟܒܝܢ ܘܡܫܬܘܕܪܝܢ ܡܦܩܕܢ̈ܐ ܠܡܕܘܡܝܢ. ܘܟܠ ܐܡܠܝܐ ܦܝܪܘܣܛܠܛܝܩܝܐ ܡܦܩܕܢ̈ܐ ܠܝܒܫܐ. ܘܠܐ ܐܡܟܝܢ ܦܝܪܘܣܛܠܛܝܩܝܐ ܡܦܩܕܢ̈ܐ ܠܡܥܝܐ.

٣ ـ ܣܘܓܐܐ ܡܥܝ̈ܢܝܐ : ܕܟܠ ܡܕܦܠܓܘ ܗܕܪܡܫܐ ܡܦܩܕܢܝܬܐ، ܠܗ ܡܚܕܘܪ ܕܡܥܝܐ ܙܥܘܪܐ، ܘܡܛܝܒ ܟܠ ܐܝܕܝܐ ܡܦܩܕܢ̈ܐ ܠܡܕܘܡܝܢ ܒܠܚܘܕ ܒܡܢܬ̈ܐ ܕܪܟܒܝܢ ܘܐܝܕܝܐ ܡܦܩܕܢ̈ܐ ܠܚܕܟܘܢܘܬܐ ܐܝܟ ܓܒܪܝܢ ܘܡܬܠܚܡܝܢ ܘܠܐܬܚܝܢ.

ܡܬܩܘܡܢ ܗܠܝܢ ܕܡܫܘܕܥܐ (Peristalsis) ܐܝܟ ܕܡܬܟܝܢ ܠܟܠܠܐ ܗܘܠܟܝܐ، ܦܠܓܐ ܡܢ ܡܫܘܕܥܐ ܒܗܡܕܪܢܝܐ، ܠܗ ܡܚܕܘܪ ܕܡܥܝܐ ܒܡܣܝܒܪܐ ܕܗܘܕܡܐ ܠܗ ܡܥܝܐ ܒܣܘܓܐܐ ܡܦܩܕܢܐ. ܐܦ ܡܗܕܘܟܐ ܡܣܝܒܪܐ ܠܐܘܟܠܐ ܕܡܠܘܐܐ ܡܢ ܦܘܡܐ ܡܕܘܕܝܢ̈ܐ ܓܘܐ̈ܢܝܐ ܐܣܛܘܡܟܐ ܦܬܚܐ ܗܢܐ ܡܬܩܘܡܘܢ ܒܗܘܡܢܐ. ܐܝܟ ܕܡܬܝܢ ܠܣܠܩܐ ܡܕܝܢܬܐ ܦܐ ܠܗ ܡܥܝܐ ܕܐܘܪܚܐ ܠܡܦܩܐ، ܕܠܐ ܒܚܒܪܬܐ ܒܟܒܕܐ، ܐܝܟܢܐ ܓܪܕܠܦܢܝܢ. ܝܘܠܦܢܐ ܐܚܪܢܐ ܘܚܕܐ ܐܣܛܘܡܟܐ (١ ـ ٢٢)



(ܒ) ܪܘܒܐ ܕܟܘܫܬܐ

(ܐ) ܨܘܪܬܐ ܡܬܩܢܬܐ ܠܡܥܝܐ ܙܥܘܪܐ ܡܒܘܢܐ ܠܟܘܫܬܐ

ܨܘܪܬܐ (١ - ٢٢) ܡܒܘܢܐ ܠܟܘܫܬܐ ܕܡܥܝܐ

ܘܚܕܬܐ ܕܪܕܘܡܝܐ ܡܫܬܠܡܐ ܒܪܒܘܝܘܬܐ ܡܢ ܦܠܛܐ ܕܦܩܪܬܐ ܡܫܢܐ ܠܒܪܬܐ ܚܕܢܬܐ ܘܦܪܘܫܝܬܐ ܠܫܡܘܫܐ ܐܡܝܢܐ . ܐܝܟܢܐ ܡܫܐ ܡܚܕܝ ܒܡܘܢܬܐ ܐܪܠܝܬܐ ܡܫܬܠܦܐ ܠܗܘ. ܠܚܕ ܡܢܐ ܡܠܘܫܐ ܡܢ ܢܛܘܦܘܬܐ ܕܡܥܝܐ . ܒܝܕ ܡܬܒܪܝܢܘܬܐ ܕܫܠܒܬܐ ܠܡܠܫܐ ܕܡܪܪܬܐ . ܘܒܬܪ ܗܕܐ ܦܝܫ ܒܪܐ ܚܕ ܡܘܡܐ ܡܢ ܢܛܘܦܘܬܐ ܒܝܕ ܠܡܫܘܚܬܐ ܠܫܡܘܫܐ ܐܪܒܥܐ ܘܠܠܡܫܪܝ .

ܐܘܡܘܬܐ ܠܦܠܛܐ ܡܢܫܬܐ . ܡܬܝܢ ܡܢܝܢܐ ܚܠ ܡܢܐ ܘܐܘܢܐ ܘܒܬܡܝܢܐ ܘܡܠܘܐܐ ܗܘܕܫܐ ܠܐ ܡܘܡܪܐ . ܐܘ ܠܐ ܦܪܕܐ ܐܝܟ ܗܠܝܠܘ، ܘܡܚܕܝ ܐܢܫܐ ܠܡܥܝܐ ܫܠܡܐ ܕܦܝܫ ܡܕܘܦܐ ܠܒܪ ܦܠܛܐ . ܘܦܝܫ ܠܡܥܝܐ ܐܢܫܝܢ ܒܢܘܪܫܐ ܕܕܡܐ . ܘܠܡܦܩܐ ܕܦܝܫ ܚܕ ܡܢܘܬܐ ܠܒܘܫܐ ܘܪܬܝܬܐ ، ܠܗ ܒܘܪܬܐ ܕܦܠܛܐ .

٦ - ܠܡܦܛܬܐ :

ܡܢܗ ܡܒܘܪܬܐ ܗܘܠܒܢܝܬܐ ܘܐܘܡܐ ܕܟܘܫܬܐ ܟܫܠܐ ܗܘܕܫܐ ܒܡܢܬܐ ܒܡ ܫܠܒܐ ܡܫܘܚܬܐ ܠܡܥܝܐ ܡܫܝܢܐ ܠܡܦܩܬܐ ܕܡܢܝܬܗ

ܘܡܩܪܒ ܒܡܢܬܐ ܡܢ ܓܙܪܬܐ ܕܠܡܝܘܬܐ. ܡܒܢܝܐ ܒܡܢܬܐ ܚܕܐ ܒܕܡܘܬܐ ܡܢ ܒܘܪܬܐ ܡܕܡܝܢܐ. ܐܝܢܐ ܕܗܘ ܚܕܒ ܟܠ ܚܕ ܘܩܘܪܐ ܐܩܘܪܐ. ܘܐܟܪܙܐ ܡܢ ܡܢܐ ܕܡܢܐ. ܒܡܬܝܚܘܬܐ ܚܕ ܡܢܐ ܠܡܩܝܐ ܦܬܚ ܠܡܣܪܐ ܠܓܘܗ ܡܠܘܐܐ ܡܥܪܢܐ. ܘܡܬܢܐܠܗ ܠܡܣܪܐ ܕܩܠܦܐ ܕܦܬܪܐ. ܦܬܚ ܠܡܣܪܐ ܠܓܘ ܡܢܝܢܐ ܡܥܬܝܐ. ܘܡܢܗ ܐܘܠܒ ܒܕ ܡܘܠܟܝܐ ܒܕܡܐ ܠܓܒܪܐ. ܘܡܢܗ ܦܬܚ ܡܡܘܠܟܐ ܠܒܘܪܬܐ ܕܩܠܦܐ. ܘܠܗ ܒܪܢܫܐ ܦܬܚ ܒܘܪܫܐ ܠܗ ܡܢܝܢܐ ܕܡܢܡܐ ܡܢ (ܐ — ܒ) ܬܟܢܐ. ܘܒܪܢܫܐ ܠܗܘܢ ܠܡܝܘܬܐ ܕܩܠܦܐ ܕܦܬܪܐ. ܘܡܠܟܠ ܪܒܐ ܡܢ ܡܢܐ. ܘܡܬܠܟܝܢ ܡܢܝܢܐ ܣܠܝܡܐ (ܡܘܠܘ) ܒܠܡܝܘܬܐ ܕܪܒܘܬܐ ܕܡܢܐ ܘܐܘܦܝܐ ܡܢ ܬܪܥܝܐ ܕܗܘܪܫܐ ܐܝܟ ܕܦܬܚ ܡܪܘܦܝܐ ܠܗܘܢ ܡܢ (ܐ — ܒ) ܬܟܢܐ. ܘܦܬܚ ܡܪܘܦܝܐ ܚܕܡܐ ܩܠܦܐ ܕܒܘܣܠܦ ܚܢܐ ܒܪܒܝܥܐ.

ܘܒܘܪܟܐ ܡܠܟܝܡ ܡܘܠܘ. ܗܪܡܐ ܕܠܡܝܘܬܐ ܘܡܪܦܬܐ ܒܣܪܐ ܒܪܝܢܐ. ܘܐܝܟܘܬܐ ܕܒܟܝܪܐ ܕܒܘܣܠܦ ܡܟܪܢܐ ܠܗܘ. ܡܟܘܟܦ ܡܘܠܘ. ܒܡܠܟܐ ܕܚܕ ܗܘܡܐ ܡܢ ܗܝܡܘܬܐ ܕܩܠܦܐ ܕܒܪܢܫܐ ܘܡܠܟܐܢܐ ܡܢ ܒܟܡܝܐ. ܡܟܘܟܘ ܒܟܝܪܐ ܐܝܟ ܒܟܡܝܐ ܕ K .

ܦܬܚ ܡܪܘܦܝܐ ܬܪܥܝܐ ܕܗܘܪܫܐ ܒܗܡܟܡܐ ܕܟܝܟܬܐ. ܡܟܘܪܝܐ ܡܢ ܪܒܐ ܚܠܝܐ. ܘܒܘܪܬܐ ܡܪܝܐ. ܘܡܟܝܐ ܡܢ ܗܠܟܠܘ. ܘܩܘܪܐ ܟܝܬܝܐ ܠܐ ܡܘܟܪܐ. ܘܡܠܟܠ ܡܢ ܡܠܫܐ ܘܡܢ ܒܟܝܪܐ. ܘܒܟܪ ܠܗܘܢ ܕܟܝܟܐ ܠܝܘܒܠܐ ܕܡܪܪܬܐ.

ܫܘ̈ܐܠܐ ܕܦܘܫܩܐ ܬܡܝܢܝܐ (ܡܕܪܫܝܘܬܐ ܘܫܪ̈ܟܐ)

١ . ܡܢܝܢ ܒܒܪܢܘܬܐ ܡܢ ܕܐܬܪ̈ܘܬܐ ܝܢܐ ܝܗܒ ܡܕܝܢܬܐ ܕܐܘܦܩܐ:
ܩܡܘܦܠܝܢ. ܦܬܪܐ. ܐܢܘܫܐ. ܐܝܕܝܐ. ܠܠܫܢܐ. ١١٧. ܒܒܝܬܢܐ
ܕܝܢܬܐ. ܘܦܪܡܘܫܐ ܕܠܡܕܪܝ.

٢ . ܡܦܝܫ ܒܝܢ ܡܕܪܫܝܘܬܐ ܢܛܝܪܐ ܘܠܐ ܢܛܝܪܐ. ܘܟܡ ܡܕܝܢܬܐ ܕܐܘܦܩܐ ܠܐܪܝ ܐܝܟܐ ܕܡܕܪܫܝܘܬܐ.

٣ . ܡܢܝܢ ܠܐܘܪܚܐ ܕܥܡܠܬܐ ܕܐܡܝܢܐ ܠܐܘܪܫܐ ܝܗܒ ܪܥܡܐ.

٤ . ܡܢܝܢ ܠܕܐܢܘܬܐ ܕܒܘܣܠܦܐ ܕܐܘܡܦܐ ܒܘܪܟܐ ܠܐܘܡܦܐ ܒܡܫܚܐ ܘܡܢܝܢ ܠܡܪܒܒܐ ܕܡܦܫܝܠܘ.

٥ . ܕܪܘܫ ܠܦܐ ܝܡܐ ܕܒܢ̈ܬܐ ܝܠܗ ، ܣܘܥܒܢܐ ܝܠܗ ܒܝܢܐ ܒܘܪܟܐ ܡܕܪܫܘܬܐ ܪܒܝܬܐ ܠܒܢ̈ܐ ܕܐܘܪܫܐ ܝܢܐ ܢܛܝܪܐ ܢܕܘܡܝܐ.

٦ . ܡܢ ܝܠܗ ܡܒܘܥܐ ܕܒܢ̈ܬܐ ܝܢܐ:
ܐ . ܐܘܡܦܐ ܕܦܠܝܛ ܒܒܢ̈ܐ ܕܐܡܝܢܬܐ ܕܐܘܪܫܐ.
ܒ . ܐܪܥܢܝܢ ܕܗܘܐ ܐܢܫܐ.
ܓ . ܡܢܐ ܡܦܠܝܣ ܝܠܗ ܡܕܪܫܘܬܐ ܕܒܢ̈ܐ ܒܘܪܟܐ.
ܕ . ܐܪܥܢܝܢ ܦܠܝܛܐ ܡܢ ܡܕܪܫܘܬܐ ܕܒܢ̈ܐ ܒܘܪܟܐ.

٧ . ܦܝܫ ܒܝܢ ܒܥܠܕܪ̈ܐ ܕܒܥܕܢܬܐ ܘܒܥܠܕܪ̈ܐ ܕܢܛܪܬܐ ܡܢ ܠܒܪܐ ܕܦܠܝܛܘ ܠܐܘܡܦܐ ܝܗܒ ܐܘܡܠܢܬܐ ܐܢܫܝܐ . ٨ . ܦܝܫ ܒܝܢ ܐܘܪܫܐ ܕܥܡܠܬܐ ܕܐܘܪܫܐ . ܘܪܦܝܬܐ ܕܢܛܪܘܬܐ ܝܠܗ ܟܠ ܡܢ ܐܡܝܢܐ ܘܣܢܝܬܐ.

٩ . ܡܢܝܢ ܣܝܒܡܐ ܒܘܣܠܦܐ ܕܒܪܐܠܗܘܢ. ܠܦܣܪܬܢܘܬܐ ܒܐܘܪܫܐ ܕܥܡܠܝܗܝ ܠܐܘܪܫܐ.

١٠ . ܡܢ ܝܠܗܝ ܐܝܟܐ ܕܡܕܪܫܘܬܐ ܕܦܬܪܐ ܝܠܗ ܣܘܪܬܐ؟

١١ . ܪܥܘܡ ܣܝ ܡܥܕܪܢܐ ܡܣܘܪܐ ܠܐܘܪܫܐ ܕܦܘܠܚܢܐ ܕܐܢܘܫܐ ܠܦܘܬ ܐܣܝܒܬܐ ܕܡܘܦܠܐ ܘܡܢܝܠܐ.

١٢ . ܡܢܝܢ ܣܘܪܓܕܐ ܒܒܡܢܐ ܕܐܢܘܫܐ ܘܡܠܘܐܐ ܐܘܪܫܝܐ ܐܣܝܒ ܕܡܒܝܢܝ ܢܛܝܪ ܝܠܗ ܡܕܪܫܘܬܐ ܕܦܬܪܐ.

١٣ - ܡܢܗܪ ܦܫܝܛܐܝܬ ܠܐܪܥܐ ܕܐܘܪܘܦܐ ܘܦܪܘܫ ܕܒܐܬܪܐ ܡܢܐ ܐܝܬ ܒܗ ܓܪܕܝ
ܡܬܘܪܬܐ ܕܦܪܕܐ ܘܠܡܝܐ.

ܐ - ܐܣܦܣܦܛܐ.

ܒ - ܒܘܡܛܐ.

ܓ - ܓܦܦܐ ܠܘܝܕܬܐ.

ܕ - ܕܒܪܐ.

ܗ - ܗܝܕܢܐ ܕܝܕܢܐ.

١٤ - ܡܥܘܝ ܐܠܗܐ ܕܡܢ ܕܒܐܬܪܐ ܡܢܐ:

ܐ - ܡܥܢܝܬܐ ܕܙܘܒܠܬܐ ܐܝܪܘܦܝܬܐ ܘܡܟܘܬܝܬܐ ܘܡܫܘܬܦܢܝܬܐ ܐܝܬ ܒܪܘܦܐ ܝܘܒܠܝܐ ܟܘܣܠܦܐ ܕܡܟܪܝܬܐ.

ܒ - ܡܬܟܒܕ ܗܢܐ ܕܡܝܬܢܝܐ ܘܡܬܟܒܪܐ ܒܫܡܝܐ ܥܠ ܫܘܪܗܒܐ ܕܟܢܫܐ ܒܗܪܐ ܟܝܘܪܬܐ ܡܪܫܡܝܬܐ.

ܓ - ܪܒܝܬܐ ܕܦܩܕܐ ܥܠ ܠܫܢܐ ܪܗܒܐ ܘܠܐ ܪܒܝܬܗ ܥܠ ܠܫܢܐ ܟܪܝܐ.

ܕ - ܠܝܬܝܘܬܐ ܕܐܘܪܠܝܐ ܕܦܪܕܐ ܐܝܬ ܒܘܠܟܬܐ ܘܠܝܬܐ.

ܗ - ܚܝܬܐ ܕܝܡܒܐ ܕܟܡܐ ܥܠ ܕܡܐ ܕܡܫܒܠܐ.

ܘ - ܡܝܬܐ ܕܓܠܬܐ ܕܝܡܐ ܕܬܒܪ ܠܫܘܬܐ ܟܝܪܢܝܬܐ ܘܡܟܝܢܬܐ.

ܙ - ܦܠܫܬܐ ܕܐܘܝܡܐ ܡܝܬܠ ܟܒܘܕܘܬܗ ܐܝܬ ܕܪܒܐ ܝܠܕܐ ܕܫܡܫܘܬܐ

ܚ - ܡܫܘܬܐ ܕܐܝܬܝܐ ܣܢܐ ܐܝܬ ܐܢܫܘܬܐ ܕܟܘܣܠܦܐ ܡܢܝܠܬܐ ܘܐܒܘܪܐ ܒܪܡܫܐ ܗܒܪܘ ܐܢܫܐ.

ܛ - ܐܝܬܘܬܐ ܕܐܦܪܐ ܗܘܝܐܐ ܡܢ ܐܝܡܫܐ ܡܦܪܕܝܐ ܐܝܬ ܗܘܪܡܝܐ ܘܢܝܪܐ.

١٧ - ܪܟܘܗ ܥܡ ܪܫܘܬܐ ܡܢ ܕܒܐܬܪܐ ܡܢܐ:

ܐ - ܚܕ ܡܫܪܝܬܐ ܡܢܗܘܪܐ ܠܦܪܠܝܘܬܐ ܕܒܢܝܐ ܒܗܪܐ.

ܒ - ܚܕ ܡܫܟܠܬܐ ܐܪܝܘܬܢܝܐ ܐܝܬ ܡܕܝܢܐ ܕܗܒܕܐ ܡܢܗܘܪܐ ܐܠܐ ܕܟܐ ܕܟܘܪܬܐ.

ܓ - ܚܕ ܡܫܪܝܬܐ ܡܢܗܘܪܐ ܠܦܪܕܐ ܟܠܟܝܢܐ.

ܕ - ܐܘܪܠܝܐ ܕܦܪܕܐ ܐܝܬ ܒܘܠܟܬܐ ܕܐܪܟܐ.

ܦܣܩܐ ܬܡ̈ܢܝܐ
ܡܘܒܠܢܘܬܐ

١ . ܗܘܒܠܐ ܕܡܘܒܠܢܘܬܐ

ܠܐ ܟܠܗ̇ ܡܕܝܢܬܐ ܠܚܝܐ ܠܦܘܬܐ ܥܠ ܚܘܒܬܐ ܐܠܐ ܐ. ܡܫܚܠܦ ܡܠܘ̈ܐܐ ܥܡ ܡܣܘܕܪܗ ܒܦܩܘܕܬܐ. ܚܠܦ ܡܢܗ ܡܢ ܕܗܘܐ ܡܠܝܗ ܡܘܬܪܬܐ ܘܕܦ ܠܗܘ ܠܡܒܕܘܬܗ. ܘܐ. ܐܢ ܡܢܗܝ ܒܐܘܪܚܐ ܒܘܫܠܦܐ ܒܗܘܢܐ ܚܫܡܐ ܐܡܝܢܘܬܗ ܚܝܐ. ܐܦ ܗܢܕܝ ܟܠܝܗ ܦܠܚܘܬܐ ܕܒܘܫܠܦ ܚܝܐ ܥܠ ܡܕܝܢܬܐ ܕܡܠܘ̈ܐܐ ܦܠܚܐ. ܒܘܠܝܗ ܐܝܟ ܒܘܠܐ ܕܐܢܫܐ ܡܢ ܦܠܚܘܬܐ ܒܡܫܚܬܐ. ܟܕ ܗܠܐ ܕܪܚܡ ܐܝܡܐ ܥܡ ܡܠܘ̈ܐܐ ܐܚܪ̈ܢܐ ܗܘ ܕܦܠܚ ܥܠܗ. ܐܦ ܗܠܝܢ ܡܕܝܢܬܐ ܕܡܠܘ̈ܐܐ ܦܠܚܐ ܡܢ ܦܠܚܘܬܐ. ܗܐ ܕܐܢ ܡܢܘܒܠܗ ܐܘ ܡܚܒܠܗ. ܘܚܕܐ ܗܝ ܐܝ ܒܫܠܦܬܐ ܕܡܠܘ̈ܐܐ ܦܠܚܐ ܠܡܠܘ̈ܐܐ ܐܚܪ̈ܢܐ ܡܫܠܦܐ. ܘܗܝ ܩܪܝܐ ܠܗ ܡܒܠܢܘܬܐ ܒܡܘܒܠܢܘܬܐ ܟܝܡܝܝܬܐ (Chemical Transport). ܘܐܝܬ ܡܬܚܙܝܢܘܬܗ ܠܚܕܐ ܕܡܬܐ ܐܚܪܢܝܬܐ ܡܢ ܦܠܚܐ. ܘܗܝ ܐܚܪܬܐ ܡܢ ܡܘܒܠܢܘܬܐ. ܠܗܘ ܕܗܘܐ ܕܡܬܚܫܒܐ ܒܐܘܪܚܐ ܦܫܝܛܬܐ.

٢ . ܡܘܒܠܢܘܬܐ ܓܘ ܒܚܕܢܝܬܐ

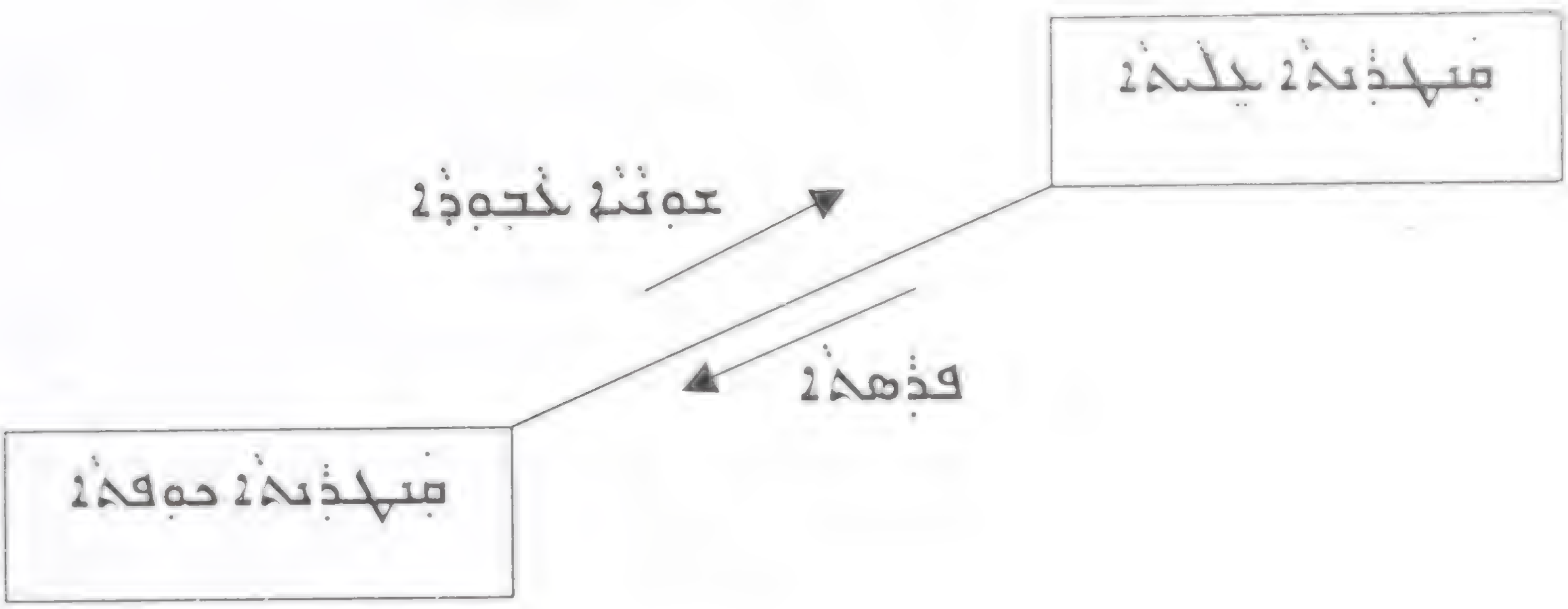
ܦܝܫ ܡܬܘܒܠ ܡܠܘ̈ܐܐ ܓܘ ܒܚܕܢܝܬܐ ܡܢ ܓܘ ܗܘܕܦܠܘܢ ܝܠܐ ܘܚܠܦܐ ܦܠܚܐ. ܘܗܕܐ ܡܘܒܠܢܘܬܐ ܝܠܗ̇ ܥܠ ܐܘܪܚܐ ܡܬܚܙܝܢܬܐ ܕܦܪܫܬܐ ܘܡܫܚܠܦܢܘܬܐ.

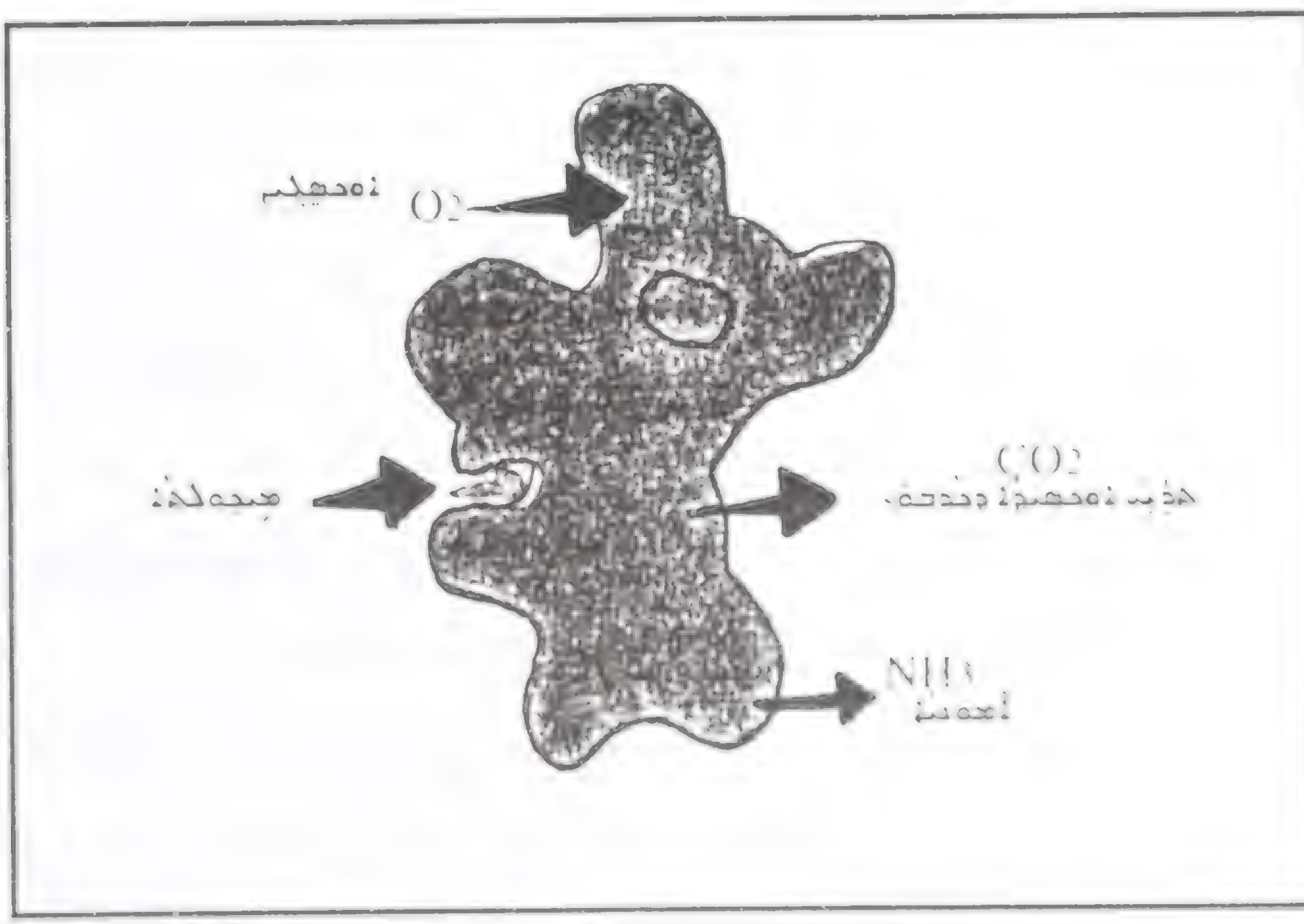
ܡܚܝܕ ܬܚܫܐ ܕܗܘܕܐ ܓܘ ܐܝܟ ܐܝܬ ܐܚܪܬܐ ܚܕܐ ܡܬܘܚܕܐ ܡܠܝܢܬܐ ܠܦܪܫܬܐ ܕܦܠܚܐ ܒܘܫܠܦ ܚܝܐ. ܐܢ ܝܗܒܐ ܠܡܣܘܕܪܐ ܒܪ̈ܝܐ. ܡܚܠ ܒܦܬܚܗ ܓܘ ܗܘܕܐ. ܟܠܚܐ ܡܚܕܢܐ ܚܕܬܐ ܡܠܘܗ. ܘܡܚܕܪܠܐ ܠܚܕܬܐ ܕܡܠܘ̈ܐܐ ܐܚܪ̈ܢܐ ܐܢܫܐ ܠܒܘܫܠܦ ܚܝܐ ܕܗܘܕܐ.

ܐܝܬ ܡܬܒ ܡܠܘ̈ܐܐ ܡܘܬܪܢܐ ܠܚܕܬܐ ܡܢ ܡܣܘܕܪܗ. ܐܝ ܒܦܪܫܬܐ. ܘܐ ܒܫܘܚܠܦܬܐ ܕܡܘܒܠܢܘܬܐ ܚܝܘܬܐ (Active Transport) (ܨܘܪܬܐ ٢ - ١)

. ܡܦܠܛ ܒܚܕܐ ܐܘ ܒܬܪܬܐ ܐܝܟ ܡܫܘܬܦܘܬܐ ܕܡܬܚܠܦܢܘܬܐ ܚܕܘܬܐ ܚܕ ܡܢܗܝ ܡܢ ܗܘܦܟܐ . ܡܛܠ ܙܘܥܐ ܕܡܬܚܠܦܢܘܬܐ ܒܕܐ ܕܥܘܒܕܐ ܕܝܠܢܝܐ ܕܓܠܘ̈ܐ ܡܥܒܪܢܐ ܠܦܪܫܬܐ . ܘܦܪܫܬܐ ܒܪܢܫܐ ܡܢ ܦܓܪܐ ܕܡܥܒܕܢܘܬܐ ܒܘܣܡܐ .

ܐܝܢܐ ܒܪܐ ܘܦܟܐ ܐܝܟ ܡܬܚܠܦܢܘܬܐ ܚܕܘܬܐ . ܘܡܬܚܪܬܐ ܡܠܘ ܡܬܚܫܚܬܐ ܕܪܕܝ ܡܫܘܬܦܘܬܐ ܒܡܬܚܬܐ ܕܓܠܘ̈ܐ ܠܒܪܝܐ ܕܓܠܝܬܐ ܐܘ ܠܓܠ ܡܢܗ . ܐܝܟ ܕܡܚܘܝܐ ܠܗ ܒܝܬܐ ܡܕܪܫܐ :





ܨܘܪܬܐ (٢ - ١) ܚܘܠܦܐ ܕܓܠܘ̈ܐ ܒܝܢ ܚܝܘܬܐ ܘܡܚܕܪܬܗ

ܐܦ ܚܝܘ̈ܬܐ ܚܠܝ̈ܢܐ ܕܗܕܡܘܢܝܐ ܡܬܚܠܦܐ . ܐܝܟ ܪܚܫܐ ܡܬܡܫܚܢܝܬܐ ܘܡܬܪܓܫܢܝܬܐ ܚܕ ܓܒܐ ܡܬܡܢܝܢܐ ܠܚܠܝ̈ܐ ܦܠܘ̈ܓܐ . ܘܐܝܟ ܚܝܘܬ ܒܦܪܫܬܐ

ܕܩܠܘܬܐ ܡܢ ܦܪܘܛܘܦܠܣܡ ܠܒܪܝܬܐ ܐܘ ܒܝܢܬܐ. ܗܢܕܐ ܠܣܘܪܐ ܕܡܫܘܬܐ ܥܠ ܗܕܐ ܓܢܒܝܐ ܕܝܠܗܿ.

٣ - ܡܫܘܚܠܦܘܬܐ ܓܘ ܢܨܒܐ

ܡܢܝܢ ܩܠܘܬܐ ܦܪܝܫܐ ܘܠܐ ܦܪܝܫܐ ܒܦܘܪܫܐ ܐܚܝܢܬܐ ܓܘ ܓܘܫܡܐ ܕܢܨܒܐ ܚܕ ܡܢ ܚܕܐ ܕܡܫܬܐ ܠܐܚܪܢܬܐ. ܘܡܢܝܢ ܡܢܐ ܘܡܠܝܐ ܘܩܠܘܬܐ ܦܫܝܛܐ ܐܚܪܢܐ ܒܐܘܪܚܐ ܕܦܪܫܬܐ ܓܘ ܡܕܘܪܐ ܕܚܘܕܬܐ. ܐܘ ܒܐܘܪܚܐ ܕܐܫܕܐ ܦܠܘܡܝܐ (Plasmodosmata) ܐܝܟ ܕܐܫܕܝ ܠܦܪܘܛܘܦܠܣܡ ܕܚܘܕܬܐ ܚܕܐ. ܘܡܫܢܝܬܐ ܗܠܝܢ ܡܦܠܓܐ ܕܡܫܘܚܠܦܘܬܐ ܠܗܕܝ ܣܛܘܪܘܬܐ ܝܠܗ ܡܢܝܢܬܐ ܕܩܠܘܬܐ ܠܐ ܦܪܝܫܐ ܘܡܢܝܢܬܐ ܕܩܠܘܬܐ ܦܪܝܫܐ.

٣ - ١ - ܡܢܝܢܬܐ ܕܩܠܘܬܐ ܦܪܝܫܐ :

ܡܢ ... ܐܝܬ ܓܘ ܢܨܒܐ ܡܢ ܠܒܪ ܠܓܘ. ܘܡܢ ܬܡܢ ܠܡܫܪܝܗ ܒܡܫܟܚܘܬܐ ... ܡܢܝܢ ܡܫܪܝܗ ܠܫܡܐ ܘܦܪܕܐ ܘܗܘܡܐ ܢܨܒܝܐ ܐܚܪܢܐ. ܕܦܬܐ ܡܘܩܠܣܬܐ ܚܕܐ ܡܢܬܐ ܩܠܝܠܬܐ ܡܢܝܗ ܓܘ ܦܠܠܘܬܐ ܚܘܠܢܝܬܐ. ܘܬܡܢ ܦܪܝܫ ܦܝܫ ܡܫܘܠܡܐ ܗܘܡܐ ܥܪܩܐ ܒܐܘܪܚܐ ܕܡܘܪܟܢܬܐ ܒܛܘܪܘܬܐ ܕܪܝܫܐ.

٣ — ١ — ١ - ܦܘܠܚܢܐ ܕܩܠܘܬܐ ܡܫܩܝܢܐ :

ܬܡܢ ܕܦܪܝܫܝܢ ܠܡܫܪܝܐ ܡܢܐ ܘܡܢܐ ܕܝܗܒܝܗ ܡܢ ܩܠܝܫܐ ܒܡܫܟܚܘܬܐ ܕܚܘܕܬܐ ܕܡܫܘܚܠܦܬܐ ܝܪܩܢܝܬܐ. ܘܚܒܪܝ ܡܢ ܓܘ ܩܠܦܬܐ (Cortex) ܘܬܡܢ ܦܪܝܫ ܩܠܦܬܐ ܓܘܝܬܐ (Endoermis) ܘܡܘܦܪܐ ܒܪܘܒܢܝܐ. ܡܫܝܢ ܬܡܪܝܘ ܠܡܫܩܝܐ (Xylem). ܘܡܢܝܗ ܓܘ ܗܡܘܪܐ ܕܡܫܩܝܐ ܓܘ ܥܩܪܐ ܦܠ ܕܡܫܝܢ ܠܗܡܘܪܐ ܕܡܫܩܝܐ ܓܘ ܛܘܪܦܐ (ܐܫܟܚܬܐ ٢ — ٢)

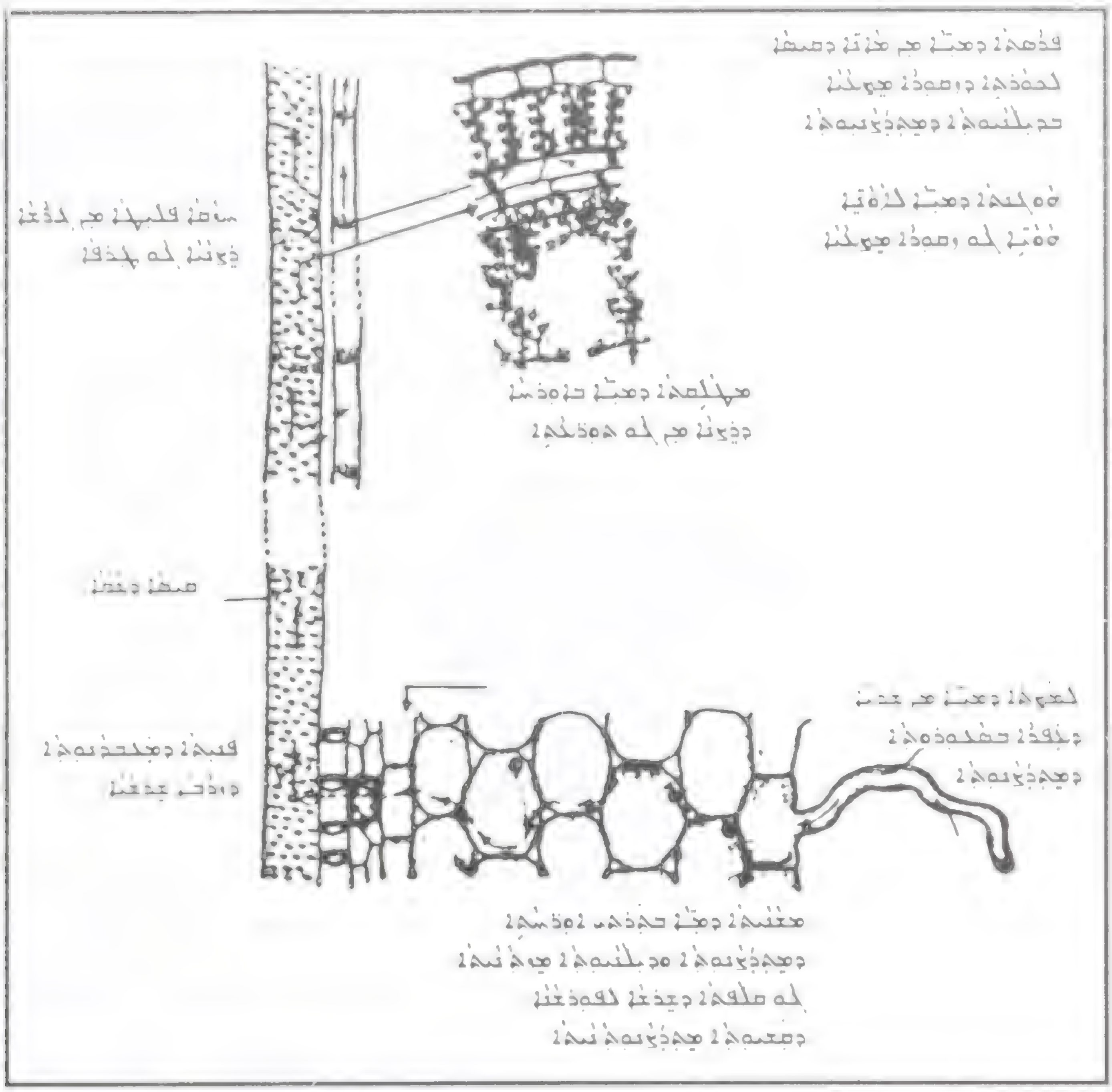
ܡܗܘܪܝܐ ܝܠܗ ܗܡܘܪܐ ܕܡܫܩܝܐ ܡܢ ܩܢܝܐ (Vessels) ܘܡܫܩܝܢܝܬܐ (Tracheids) ܘܦܬܠܐ ܕܡܫܩܝܐ (Fibers Xylem). ܘܚܘܕܬܐ ܓܘܝܬܐ ܡܫܩܝܢܝܬܐ (Xylem Parendyma) ܘܡܢܝܢܐ ܕܚܘܕܬܐ ܕܡܢܐ ܘܩܠܝܫܐ ܡܫܘܚܠܦܬܐ ܓܘܝܗ. ܡܢ ܓܘ ܩܢܝܐ ܘܡܫܩܝܢܝܬܐ ܘܓܘ ܢܒܢܝܬܐ ܐܝܠܝܢ ܒܪܘܪܒܐ ܐܝܟ ܥܪܘܩܐ. ܐܝܟܐ ܕܟܠܗ ܒܢܝܗ ܩܢܝܐ ܡܫܩܝܐ. ܐܠܐ ܫܒܝܒ ܥܠ ܡܫܩܝܢܝܬܐ ܒܠܚܘܕ. ܗܘܝ ܡܫܩܝܢܝܬܐ ܐܝܟ ܐܘܪܚܐ ܪܒܬܐ ܠܡܒܪܬܐ ܕܡܢܐ ܘܩܠܝܫܐ. ܘܦܝܫܠܗ ܡܫܘܪܪܬܐ ܕܡܢܐ ܡܢܝܢ ܡܢ ܓܘ ܡܫܩܝܐ ܒܢܘܫܝܐ. ܗܢܕܝ ܠܡܪܫܡܬܐ ܕܚܕܐ ܚܠܡܬܐ ܠܡܫܪܬܐ ܠܚܠܝܗ ܗܡܘܪܐ ܢܦܝܠܐ ܠܬܪ ܗܡܘܪܐ ܕܡܫܩܝܐ ܥܠ ܥܩܪܐ. ܘܦܝܫܠܗ ܚܘܝܬܐ ܠܐ ܡܬܒܪܬܐ ܕܒܘܢܝܐ ܕܡܢܐ ܘܩܠܝܫܐ. ܒܪ ܗܝ ܠܐ ܡܘܬܪܐ ܠܗ ܒܡܫܬܐ ܕܫܪܦܐ ܘܗܘܡܐ ܥܠܝܐ ܐܚܪܢܐ.

٣ — ١ — ٢ - ܐܘܪܚܬܐ ܕܡܣܬܠܩܘܬܐ ܕܡܝܐ ܡܢ ܥܩܪܐ ܠܛܪܦܐ :

ܐܝܬ ܐܝܟ ܡܢܝܢܐ ܕܐܘܪ̈ܚܐ ܠܡܦܩܬܐ ܕܣܠܩܬܐ ܕܡܝܐ ܘܡܠܚ̈ܐ ܠܐܝܠܢܐ ܒܡܬܥܕܪܢܘܬ ܡܢܝܢܐ ܕܥܠܬ̈ܐ ܗܢܐ :

ܐ . ܐܘܠܨܢܐ ܕܥܩܪ̈ܐ (Root Pressure) :

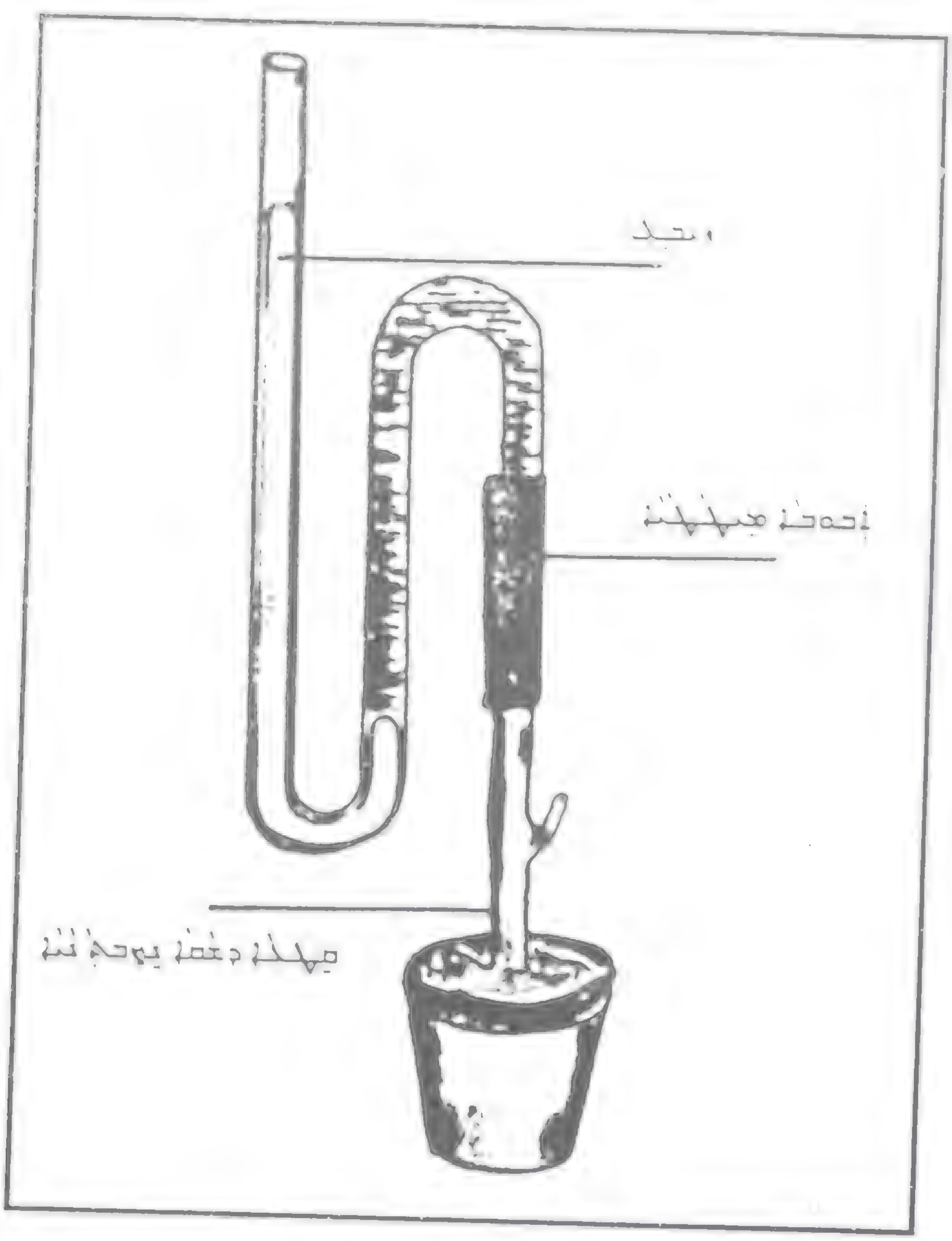
ܦܠܚ ܚܝܠܐ ܕܐܘܠܨܢܐ ܕܥܩܪ̈ܐ ܥܠ ܡܪܕܝܬܐ ܕܡܝܐ ܠܥܠ ܐܝܟ ܕܗܘܐ ܡܬܢܫܝܐ ܕܡܫܬܠܡܬܐ ܕܡܝܐ ܡܢ ܒܘܨܝܢܐ ܢܘܡܢܐ ܒܘܟܪܐ . ܘܒܥܠܬܐ ܕܦܪܣܬܐ ܕܡܝܐ ܠܗ ܫܪܟܐ . ܘܠܡܢ ܥܩܪ̈ܐ ܒܡܫܘܬܐ ܕܦܪܣܬܐ ܡܢ ܡܝܐ ܒܥܠܬܘܬܐ ܕܡܬܚܪܝܬܐ (Osmosis) ܘܦܪܥܬܐ ܠܗ ܪܦܬܐ ܕܐܘܠܨܢܐ ܥܩܪܐ ܒܡܘܪ̈ܩܐ ܕܣܠܩܬܐ . ܘܠܗ ܚܝܠܐ ܢܣܒܐ ܒܡܘܪܥܩܐ ܕܢܡܘܣܘܬܐ ܠܗܝܬܐ ܘܒܪܝܬܐ . ܐܝܟܢܐ ܠܐ ܢܝܕ ܪܒܬܐ ܡܢ ܚܕ ܘܪܒܐ ܐܚܪܢܐ (ܨܘܪܬܐ ٢ — ٣) .



ܨܘܪܬܐ (٢ — ٢) ܐܘܪܚܬܐ ܕܡܫܟܚܬܐ ܕܡܝܐ ܘܡܠܚ̈ܐ ܡܢ ܥܩܪܐ ܠܛܪܦܐ (ܒܐܘܪܚܐ ܕܓܪ̈ܒܐ ܥܝܢ̈ܐ) .

ܚܝܠܐ ܕܘܪܒܐ ܥܩܪ̈ܐ ܡܦܝܩ ܠܡܠܘܬܐ ܕܡ̈ܝܐ ܠܗ ܫܒܝܠܐ ܕܩܢ̈ܝܐ ܘܫܒܝܠܐ
ܕܟܬܐ ، ܡܛܠ ܡܫܪܝܬܐ ܕܡ̈ܝܐ ܠܪܘܡܐ ܕܐܝܠܢܐ ܪܡܐ ܪ̈ܒܐ . ܗܫܬܐ ܡܠܘ ܠܢܬܒ
ܡܢ ܚܕ ܫܪܫܐ ܐܝܠܢ̈ܐ . ܕܫܡܫ ܒܗ ܪܡܘܬܐ ܕܟܬܡܐ . ܘܦܬܠܘ ܫܘܒܬܐ ܕܡ̈ܝܐ
ܢܚܒ ܕܪܡܘܬܠ ܕܢܫܘܦܘܬܐ ܐܠܢ̈ܬܐ . ܘܡܠܘܬܐ ܕܡ̈ܝܐ ܢܦܩܐ ܚܕ ܫܪܫܐ ܐܝܠܢ̈ܐ
ܠܚܠ 5 ܡ ܒܪܡܘܬܐ . ܘܗܫܬܐ ܡܠܘ ܐܝܠܢܐ ܗ݁ ܕܝܠܘ ܪܡܘܬܘ ١٠٠ ܡ ܠ ٢٠
ܫܪ̈ܫܐ ܐܝܠܢ̈ܐ ܠܡܫܩܝܢܘܬܐ ܕܡܠܘܬܐ ܕܡ̈ܝܐ . ܐܦ ܢܟܢܐ ܒܘܝܠܐ ١٠ ، ܫܪ̈ܫܐ ܐܝܠܢ̈ܐ
ܐܡ̈ܝܢܐ ܠܡܠܝܬܐ ܥܠ ܒܘܪܝܐ ܕܡܢܚܢܘܬܐ . ܐܦ ܦܬܠܘ ܫܘܒܬܐ ܕܚܕܟܡܐ
ܢܫܝܐ ܠܗ ܒܢܝܫ ܫܪ̈ܫܐ ܥܩܪ̈ܐ ܡܫܪ̈ܒܢܐ .

ܘܦܝܫܬܐ ܡܡܒܚܢܬܐ ܗܘܐ ܫܪ̈ܫܐ ܥܩܪ̈ܐ ܠܢܫܝܐ ܡܠܘܠܐ ܒܐܪܥܐ
ܒܡܫܚܐ ܕܒܘܝܠܦܐ ܕܡܝܐ . ܘܟܕ ܗܘ ܗܘܐ ܡܝܐ ܕܡܠܘܬܐ ܕܡ̈ܝܐ ܒܫܘܦ
ܗܘܪܗܒܗ . ܡܢ ܗܘ ܡܚܘܝܐ ܠܗ ܕܚܝܠܐ ܕܘܪܒܐ ܥܩܪ̈ܐ . ܠܐ ܠܗ ܡܝܬܝܐ
ܕܗܘܐ ܐܝܬܐ ܠܗ ܡܫܘܕܥܬܐ ܕܡܠܘܬܐ ܕܡ̈ܝܐ .



ܨܘܪܬܐ (٢ — ٣) ܢܘܣܝܐ ܠܡܚܘܝܐ ܕܘܪܒܐ ܥܩܪ̈ܐ .

ܒ. ܕܒܝܩܘܬܐ ܣܥܪܢܝܬܐ (Copillarity) :

ܐ. ܡܘܬܒܠܘܢ ܐܢܘܢ ܡܝܐ ܒܝܕ ܕܐܒܘܒܘܬܐ ܡܣܟܬܐ ܘܡܫܪܒܠܘܢ ܠܦܠܚܐ ܕܣܩܐ ܠܐ ܡܢܐ. ܐܘ ܠܐ ܣܓܝܐܐ ܣܦܩܐ ܐܚܪܢܐ. ܡܢܐ ܒܝܕ ܕܐܡܪ ܒܣܗ ܠܟܘܢܐ ܒܝܕ ܡܠܐ ܡܢ ܒܘܚܕ ܚܡܪܐ ܚܕܬܐ. ܘܡܢܐ ܕܟܝܪ ܡܠܬܐ ܕܐܒܘܒܐ. ܒܐܝܕܐ ܕܐܒܘܒܬܐ ܕܡܢܐ ܠܗܘܢ. ܘܕܟܕܐ ܒܕܣܬܐ ܕܐܗܐ ܡܚܢܝܬܐ ܠܕܒܝܩܘܬܐ ܣܥܪܢܝܬܐ. ܐܘ ܢܬܘܦܘܬܐ ܥܛܝܫܬܐ ܒܝܢ ܡܢܘܦܢܝܬܐ ܕܥܝܠܐ. ܘܡܢܘܦܢܝܬܐ ܕܥܠܘܐܐ ܕܐܒܘܒܐ.

ܘܡܚܘܝܢܬܐ ܠܗ ܡܪܡܝܬܐ ܕܡܝܐ ܘܡܢܘܦܢܝܬܐ ܠܗ ܘܡܘܕܐ ܕܡܢܝܐ ܒܐܘܒܐ ܘܠܐ ܠܒܝܬܝܐ ܡܘܕܒܕܐ. ܐܝܟܐ ܡܕܘܢܝܐ ܡܚܘܝܐ ܐܝܟ ܠܡܚܘܬܐ ܕܡܢܐ ܘܪܒܐ ܠܐܝܢ. ܒܡܚܠܨܘܬܐ ܕܐܗܐ ܥܒܕܐ. ܘܗܘܝܬܐ ܠܗ ܕܚܒܕ ܦܘܡܐ ܡܢ ܗܠܡܐ ܕܐܠܝܐ ܠܐ ܐܝܬ ܐܣܛܘܟܣ ܡܘܬܠܝܐ. ܡܚܘܝܬܐ ܠܗ ܕܦܬܐ ܡܘܕܝܕܐ ܠܚܝܠܐ ܕܕܒܝܩܘܬܐ ܣܥܪܢܝܬܐ. ܐܝܟܐ ܡܘܕܝܠܗ ܕܐܗܐ ܚܝܠܐ ܠܐ ܡܨܐ ܠܡܪܡܝܬܐ ܕܡܝܐ ܥܒܦܘ ܡܢ ܣܓܝܐܐ ܦܬܐܡܝܬܐ. ܘܡܢܠ ܕܐܗܐ ܣܘܥܪܢܐ ܠܗ ܐܘܪܚܘܬܐ ܡܪܬ ܐܒܘܒܘܬܐ ܕܟܐ ܡܫܡܫܐ.

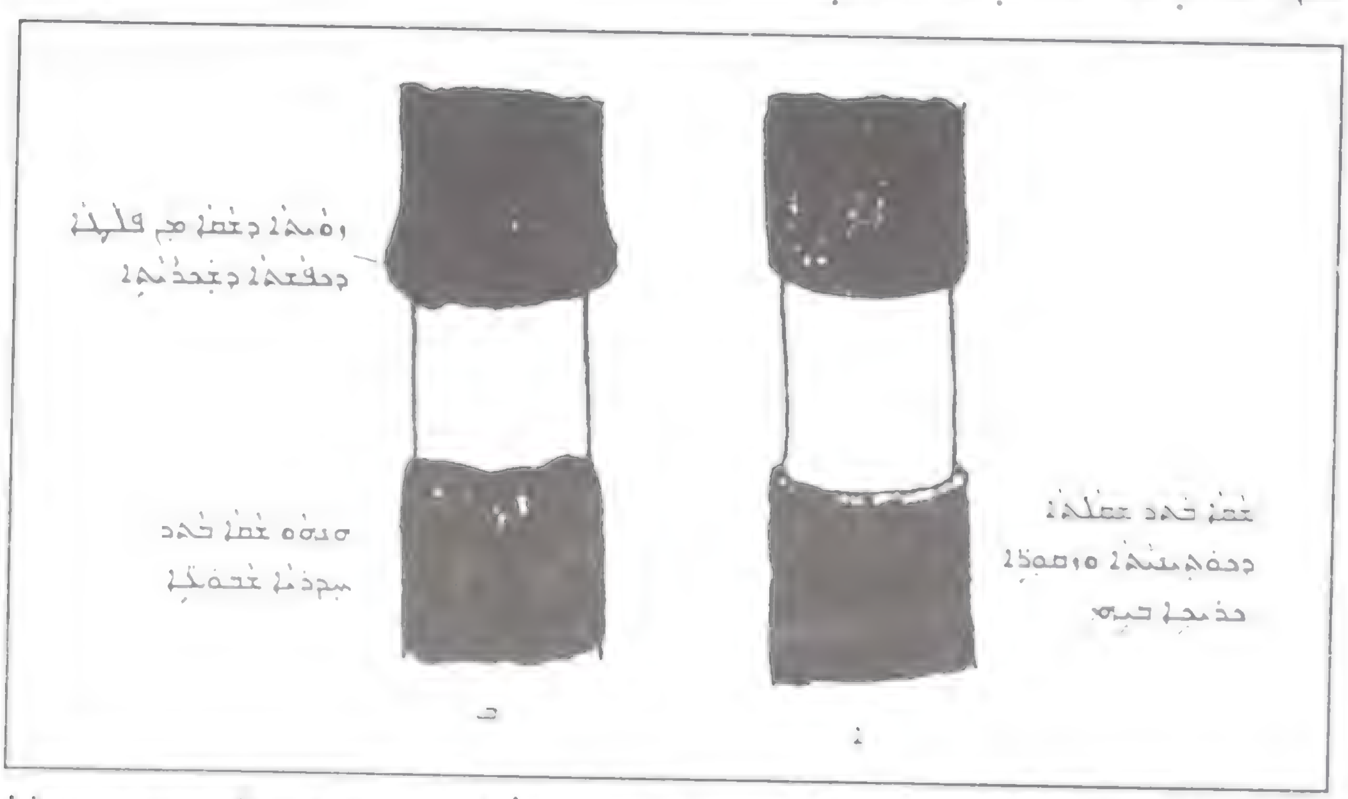
ܓ. ܢܓܕܬܐ ܕܝܘܥܬܐ (Transpiration Pull) :

ܘܚܝܠܐ ܕܢܓܕܬܐ ܕܝܘܥܬܐ ܒܡܪܡܝܬܐ ܕܡܝܐ ܐܝܬܠܗ ܐܒܘܒܘܬܐ ܕܟܕܐ. ܘܗܘ ܒܝܢܐ ܠܗ ܥܠ ܕܡܨܝܬܐ ܕܡܝܐ ܦܝܫ ܢܓܝܕܐ ܠܥܠ ܠܐ ܡܢܝܢܐ ܘܡܢܘܦܢܝܬܐ ܒܡܚܠܨܘܬܐ ܕܚܝܠܐ. ܦܠܚ ܠܗ ܛܪܦܐ. ܘܠܐ ܡܢ ܦܠܛܐ ܕܥܠܝܬܐ ܡܢ ܐܠܦܣܗ ܠܥܠ. ܒܝܕ ܡܘܦܠܚ ܒܫܘܦܬܐ ܒܓܢܢܝܬܐ ܡܢ ܡܢܐ. ܡܢ ܦܘܡܐ ܗܘܝܐ ܠܢܫܡܬܐ. ܘܦܪܢܣܝܗ ܛܪܦܐ. ܐܝܟ ܕܡܫܬܠܚ ܒܘܪܐ ܕܛܪܦܐ ܡܪܢܝܬܐ ܡܢ ܗܘܐ ܒܪܢܐ ܠܡܢܐ. ܒܐܘܪܚܐ ܕܝܘܥܬܐ. ܗܘ ܡܒܪܢܐ ܘܢܒܥܐ ܕܡܥܒܘܬܐ ܒܒܪܢܝܬܐ ܠܐܝܢ ܒܘܪܐ. ܘܐܗܐ ܢܟܒܐ ܠܐܝܬ ܒܘܪܐ ܡܚܘܝܬܐ ܡܪܕܝ ܣܒܘܥܝܐ ܡܢܐ ܡܢ ܒܘܪܐ ܠܒܘܪܐ ܠܗ ܛܪܦܐ. ܡܒܕܘܝ ܒܣܪܐ ܠܢܓܕܬܐ ܕܡܢܐ ܕܐܝܟ ܠܗ ܡܢܝܐ ܘܡܢܘܦܢܝܬܐ ܕܦܪܢܣܐ ܕܛܪܦܐ. ܘܡܚܣ ܚܝܠܐ ܕܢܓܕܬܐ ܠܥܠ. ܠܗ ܐܘܟܒܐ ܡܫܢܐ ܡܘܬܠܝܐ ܠܗ ܥܡܐ ܘܝܪܥܐ (ܐܣܛܘܟܐ ٢ — ٢). ܘܕܟܕ ܥܘܒܢܐ ܕܚܝܠܐ ܕܢܓܕܬܐ ܗܢܐ. ܠܗ ܒܡܘܕܐ ܕܡܢܐ ܒܒܪܢܝܬܐ. ܠܚܝܠܐ ܕܒܘܒܘܬܐ ܕܟܕܐ ܠܡܢܘܦܢܝܬܐ ܕܡܢܐ. ܒܝܕ ܡܕܘܢܝܐ ܕܡܢܝܐ ܕܡܢܘܦܢܝܬܐ. ܘܐܦ ܒܝܕܐ ܡܢ ܚܝܠܐ ܕܒܒܘܬܐ ܠܡܢܘܦܢܝܬܐ ܕܡܢܐ. ܦܬܐ ܠܗ ܒܝܢܬܐ ܐܗܐ ܦܘܡܐ ܒܐܘܪܚܐ

ܕܫܢ̈ܝܐ ܘܠܒܫܘܬܐ ( ) ، ܦܝܫ̈ܐ ܥܠ ܚܕ ܡܘܢ̈ܝܐ ܡܢ ܫܢܬܐ ܦܘܫܢ̈ܐ . ܡܟܝܠ ܠܝܕܥܬܐ ܕܡܢܐ ܠܕܘܡܐ ܕܐܝܠܝܢ ܘܐܝܟ ܫܢܬܐ ܡܫܘܚܬܐ ܦܝܫܬܘ ܫܬܝܬܐ ܐܝܬܘܗܝ ܠܗ ܚܡܫܐ ܕܫܢ̈ܝܐ . ܐܝܟܐ ܕܠܐ ܕܠܐ ܡܢܝܢ ܕܫܢܝܐ ܫܢܬܐ ܦܘܫܝܐ ܚܠܡܐ ܠܚܕ ܡܢܐ ܡܫܡܫܐ ܠܡܣܟܘܬܐ ܥܕܢܝܬܐ . ܘܐܝܬܘܬܐ ܕܡܘܬܐ ܫܢܬܐ ܠܗ ܥܕܢܐ . ܡܬܠܝܢܐ ܥܠ ܡܫܘܚܬܐ ܕܠܡܛܐ . ܘܐܝܬܘܬܐ ܕܡܘܬܐ ܫܢܬܐ ܠܗ ܚܕܘܐ ܡܬܚܫܒܐ ܠܐܘܠܝܬܐ ܕܡܢܐ . ܘܗܕܐ ܐܝܬܘܬܐ ܕܡܘܬܐ ܫܢܬܐ ܡܚܘܝܐ ܠܗ ܐܢܫܘܬܐ ܠܗܠܝܢ ܕܚܝ̈ܐ ܒܝܘܡܬܐ ܥܢܝ̈ܬܐ .

٣ — ٢ ـ ܡܬܚܫܒܢܘܬܐ ܕܡܠܘܐܐ ܘܓܪ̈ܡܐ (ܛܘܪ̈ܦܐ) :

ܡܢ̈ܝܐ ܛܘܪ̈ܦܐ ܕܩܝܡ ܡܫܘܕܥ ܠܗ ܡܫܘܚܬܐ ܕܓܪ̈ܡܐ ܒܘܪ̈ܟܐ ܟܠܝܕܐ . ܠܗܘܡ ܐܣܪܐ ܕܢܝܚܬܐ ܒܡܬܚܫܒܢܘܬܐ ܕܫܘܚܠܦܬܐ . ܘܗܘ ܒܘܢܝܐ ܕܛܘܪ̈ܦܐ ܒܝܘܡܬܐ ܥܢܝܬܐ ܠܗܘܢ . ܘܡܬܚܫܒܐ ܗܠܝܢ ܡܬܝܕܥܝܢ . ܒܫܒ̈ܥܐ ܕܚܕ ܥܡܐ ܝܬܝܪ̈ܐ ܚܕܐ ܥܡܐ ܕܢܝܚܬܐ . ܒܟܠܗܝܢ ܕܩܝ̈ܢܐ ܚܡܝܡܬܐ ܚܕܐ ܫܠܡܬܐ ܠܡܫܪܬܐ ܡܢ ܘܩܘܪܐ ܒܪܝܐ . ܘܡܚܬܘ ܒܡܬܚܫܒܢܘܬܐ ܗܠ ܕܡܛܝܐ ܠܡܫܪܐ . ܒܩܝܛ ܣܘܓܐ ܒܥܒܪ ܚܕ ܡܬܚܫܒ (ܡܢܝܢܐ ܡܢ ܥܘܒ̈ܕܐ) . ܕܗܘܝܐ ܕܥܡܐ ܥܠ ܚܠܡܬܐ ܚܡܝܡܬܐ . ܒܗܘ ܒܡܦܩܬܐ ܕܥܒܕܢܘܬܐ . ܘܠܐ ܡܬܚܙܝܐ ܠܗܘܢ (ܨܘܪܬܐ ٢ — ٤) . ܘܐܘܦ ܒܡܬܒܪܐ ܕܢܝܚܬܐ ܡܠܘܐܐ ܠܡܘܬܐ ܕܥܡܐ ܒܐܘ ܩܪܝܬܐ . ܐܝܟܐ ܥܕܢܐ ܕܒ ܡܫܚ ، ܡܛܠ ܐܢܐ ܡܬܚܙܝܐ ܠܛܘܪ̈ܦܐ ܐܢܫܝ̈ܐ .



ܨܘܪܬܐ (٢ — ٤) ܢܘܦܐ ܡܬܚܘܝܐ ܠܝܕܥܐ ܕܡܬܚܫܒܢܘܬܐ ܒܛܘܪ̈ܦܐ ܕܡܠܘܐܐ ܛܘܪ̈ܦܝܐ ܡܢ ܕܘܟܝܐ ܕܒܢܝܢܗܘܢ ܠܗܘܡ ܐܣܪܐ ܕܢܝܚܬܐ .

ܘܡܬܒܝܠܘܦ. ܢܘܗܝܐ ܕ ٩٠٪ ܡܢ ܟܘܢܫܐ ܕܡܠܘܐܐ ܡܥܘܒܝܐ ܠܗ ܟܘܗܒܝܢܝܬܐ ܒܠܝܗ ܢܟܕܢܝܬܐ ܘܒܠ ܕܢܝܗ ܢܟܕܐ ܕܡܝܢܐ (ܗܘܒܕܘܝ). ܘܗܘܦܩܬܐ ܠܢܟܕܢܝܬܐ ܟܘܗܒܝܢܝܬܐ، ܡܢܝܢܬܐ ܠܗ ܕܡܥܝܢ ܠܫܥܘܙܐ ܐܡܝܢܝܐ، ܐܝܟ ܫܥܘܙܐ ܕܓܠܘܛܡܝܢ (Glutamic acid)، ܘܫܥܘܙܐ ܕܐܣܦܪܛܝܢ (Aspartic acid)، ܘܐܦ ܗܘܪܡܘܢܐ ܘܚܕ ܗܘܡܐ ܡܢܝܗ ܡܢ ܡܠܝܚܐ ܝܩܕܢܝܐ.

ܡܝܐ ܗܘܕܗܢܐ ܡܢ ܦܝܢܬܐ ܕܡܬܕܪܝܬܐ (ܓܕܦܐ) ܠܦܝܢܬܐ ܕܡܦܩܬܐ (ܐܝܟ ܥܕܥܐ ܘܦܐܪܐ ܘܒܕܘܪܟܐ)، ܐܘ ܠܦܝܢܬܐ ܕܪܒܝܬܐ (ܐܝܟ ܥܠܡܐ ܘܡܥܒܘܕ ܘܪܥܐ ܕܒܝܬܐ)، ܘܒܠܚܕ ܡܝܐ ܡܢ ܦܝܢܬܐ ܕܡܦܩܬܐ ܠܦܝܢܬܐ ܕܪܒܝܬܐ. ܘܒܠ ܕܐܝܟܐ ܘܡܟܐ ܕܗܘܕܗܢܐ ܠܗ ܢܝܒܬܐ ܗܘܐ ܟܕܪܝ ܙܘܟܐ. ܠܗܝܗ ܘܠܝܠ. ܘܡܥܢܝ ܡܠܘܐܐ ܗܘܕܗܢܐ ܠܗ ܥܡܐ ܟܝܘܪܬܐ ܘܗܘܝܬܐ ܠܗ ܘܒܘܐ ܡܕܢܝܐ ܘܘܒܘܐ ܠܟܝܐ. ܘܡܢ ܟܘܗܒܝܢܝܬܐ ܠܡܥܒܘܕ. ܐܘ ܠܗܘܡܐ ܫܢܐ ܡܢ ܘܡܘܕܐ ܕܡܫܚܐ. ܘܠܦܪܡܝܬܐ ܕܙܪܝܬܐ ܟܘܪܕܢܝܬܐ ܠܢܟܘܒܐ ܥܕܟܠܐ (ܡܝܠܬܝܐ) ܠܗ ܟܘܗܒܝܢܝܬܐ.

٣ — ٢ — ١ — ܐܢܟܘܒܐ ܝܕܟܠܝܐ (Sieve Tubes) ܘܦܘܠܚܢܝܗ ܟܡܘܟܠܝܘܬܐ ܕܗܘܕܗܢܐ:

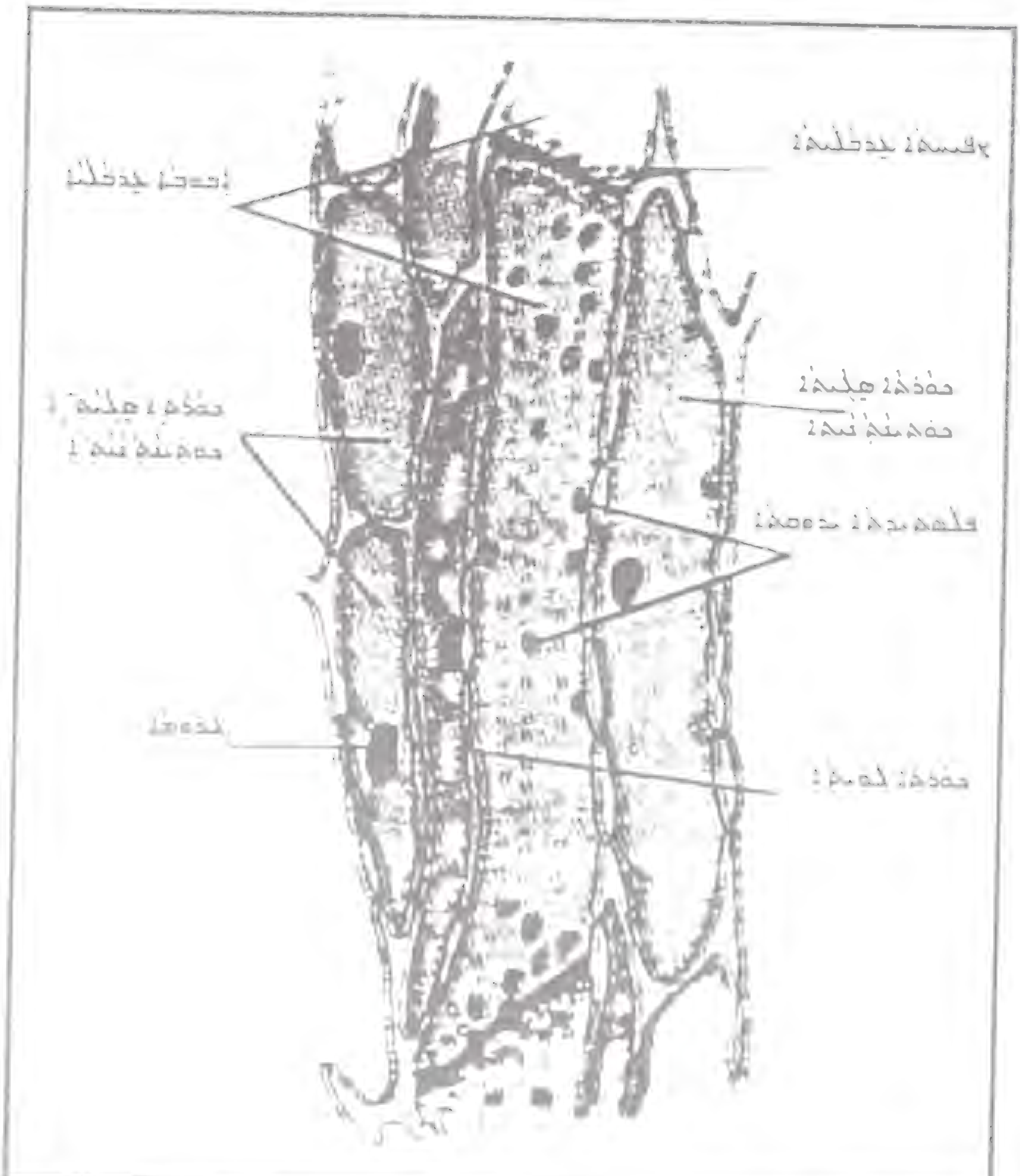
ܡܬܘܕܪܐ ܗܢܐ ܐܢܐ ܐܢܟܘܒܐ ܡܢ ܟܘܪܬܐ ܡܬܒܢܝܬܐ ܢܡܒܕܝܢܗ ܡܕܘܪܐ. ܡܕܗܝ ܫܕܢܝܬܐ ܟܘܒܠܬܐ، ܦܒܥܐ ܗܢܐ ܡܥܘܒܝܐ ܙܦܝܢܬܐ ܝܕܟܠܢܝܬܐ (Sieve Plates) (ܐܗܡܒܥܐ ٢ — ٥)، ܐܝܢܐ ܓܠܢܝܗ ܟܕܘܪܟܐ ܘܡܕܒܗܢܝܬܐ. ܠܝܬ ܐܝܬܘܗܝ ܠܢܟܘܒܐ ܝܕܟܠܝܐ ܠܗ ܟܘܗܒܝܢܝܬܗ، ܐܠܐ ܐܝܬ ܚܠܦܝܗ ܟܘܪܬܐ ܝܕܟܠܝܬܐ (Sieve Cells)، ܘܫܥܝܢ ܐܫܕܢܝܬܐ ܡܥܫܝܬܐ ܝܕܟܠܢܝܬܐ (Sieve areas) ܠܗ ܡܕܘܪܝܗ. ܘܐܢܝ ܝܕܥ ܡܠܝܠ ܡܬܒܕܘܬܐ ܗܢܐ ܡܢ ܙܦܝܢܬܐ ܝܕܟܠܢܝܬܐ.

٣ — ٢ — ٢ ـ ܫܘܼܪܵܝܵܐ ܕܡܫܘܼܚܠܦܘܼܬ݂ܵܐ ܕܗܘܼܦ̈ܵܟ̣ܹܐ ܡ̣ܢ ܫܪ̈ܟ̣ܐ ܠܟܪ̈ܘܵܟ̣ܹܐ ܕܦܘܼܫܵܩܵܐ ܕܚܲܝܘܼܬ݂ܵܐ :

ܡܲܫܟ̣ܚܝ ܗܘܼܦ̈ܵܟ̣ܹܐ ܠܗ ܒܩܘܼܝܵܡܵܐ ܒܚܲܝܘܼܬ݂ܵܐ ܚܲܠܝܼܬ݂ܵܐ، ܠܐ ܟܠܗ ܡܲܦܢܝܵܢܘܼܬ݂ܵܐ ܦܬ݂ܵܚܵܐ ܒܦܘܼܪܫܵܢܵܐ ܦܫܝܼܛܵܐ. ܘܗܵܫܐ ܐܝܬ݂ ܡܲܢܝܵܢܵܐ ܡ̣ܢ ܫܘܼܪ̈ܵܝܹܐ ܠܦܬ݂ܵܚܵܐ ܕܐܵܗܵܐ ܡܫܘܼܚܠܦܘܼܬ݂ܵܐ :

ܐ ـ ܫܘܼܪܵܝܵܐ ܕܪܕ݂ܵܝܵܐ ܕܦܪܘܿܛܘܿܦܠܵܣܡ Cytoplasmic Streaming :

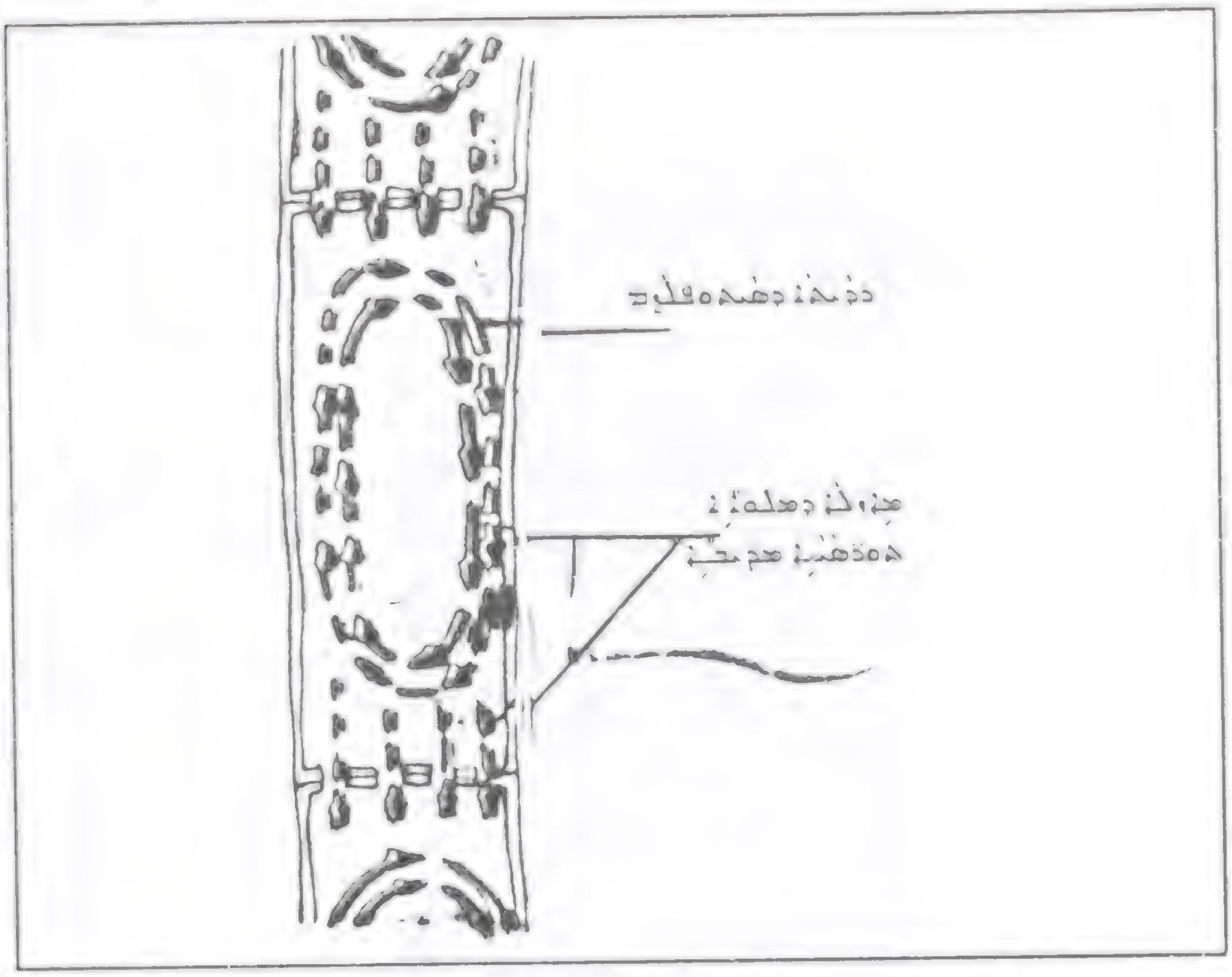
ܘܗܵܢ ܟܠܗ ܡܲܕܥܵܢܘܼܬ݂ܵܐ ܕܡܲܚܙܝܵܢܘܼܬ݂ܵܐ ܐܝܼܟ݂ ܕܦܪܠܘܿܘ، ܡܘܿܗܒܵܐ ܠܦܬ݂ܵܚܵܐ ܕܗܘܼܦ̈ܵܟ̣ܹܐ ܕܗܘܼܦ̈ܵܟ̣ܹܐ. ܘܦܪܠܘܿ ܡܘܿܗܒܬ݂ܵܐ ܒܝܕ ܢܒܝܼܐ ܕܝܠܗ ܒܫܢܬ݂ܵܐ ١٨٨٥



ܨܘܼܪܬ݂ܵܐ (٣ — ٥) ܡܲܢܚܲܙܝܵܐ ܐܝܟ݂ ܗܘܼܦܵܟ̣ܵܐ ܠܗ ܒܩܘܼܝܵܡܵܐ ܕܢܘܼܗܪܵܐ ܠܟܪ̈ܘܵܟ̣ܹܐ ܚܲܠ̈ܝܹܐ ܘܚܲܠܝܼܬ݂ܵܐ ܠܡܬ݂ܵܐ .

ܠܦܬܚܬܐ ܕܐܘܪ ܠܢܘܗܪܐ ܕܡܘܬܠܝܘܬܐ ܕܡܠܘܐ̈ܐ ܬܘܪܫܢܝ̈ܐ ܠܗ ܒܦܘܪܣܢܝܬܐ ܘܡܢܝܢ̈ܐ ܐܗܐ ܬܐܘܪܝܐ ܕܪܕܝܐ ܕܨܝܛܘܦܠܣܡ ܕܒܘܪܟܬܐ ܡܦܬܚܬܐ ܒܘܢ̈ܝܐ . ܕܡܠܘܐ̈ܐ ܬܘܪܫܢܝ̈ܐ ܡܪܝܪ̈ܐ .

ܘܐܡܝܪ ܐܝܟ ܒܘܢ̈ܝܐ ܕܪܕܝܐ ܠܨܝܛܘܦܠܣܡ ܕܐܒܘܒܐ ܒܪܟܠܝܐ . ܒܕ ܡܬܘܢܐ ܒܗܘ ܡܠܘܐܐ ܡܪܝܪܐ ܘܐܝܟ ܕܐܝܬ ܠܗ ܨܝܛܘܦܠܣܡ ܡܢ ܚܕ ܓܒܐ ܐܚܪܢܐ . ܘܡܢ ܗܪܟܐ ܡܬܝܢ ܡܠܘܐܐ ܡܪܝܪܐ ܒܦܘܪܫܢܐ ܠܗ ܐܬܪܐ ܦܠܓܢܐ . ܐܝܟ ܕܚܙܐ ܠܦܘܫܩܐ ܒܪܟܠܝܬܐ ܠܐܒܘܒܐ ܒܪܟܠܝܐ ܗܪܢܝܐ . ܘܗܕܐ ܐܝܟ ܒܨܘܪܬܐ (٢ — ٦) . ܘܦܬܠܗ ܡܘܬܒܬܐ ܒܝܘܡܐ ܕܟܠ ܚܕܘܠܐ ܕܡܬܚܝܕ ܪܕܝܐ ܕܨܝܛܘܦܠܣܡ . ܡܬܚܙܐ ܐܦ ܠܒܘܢ̈ܝܐ ܕܡܠܘܐ̈ܐ ܬܘܪܫܢܝ̈ܐ .

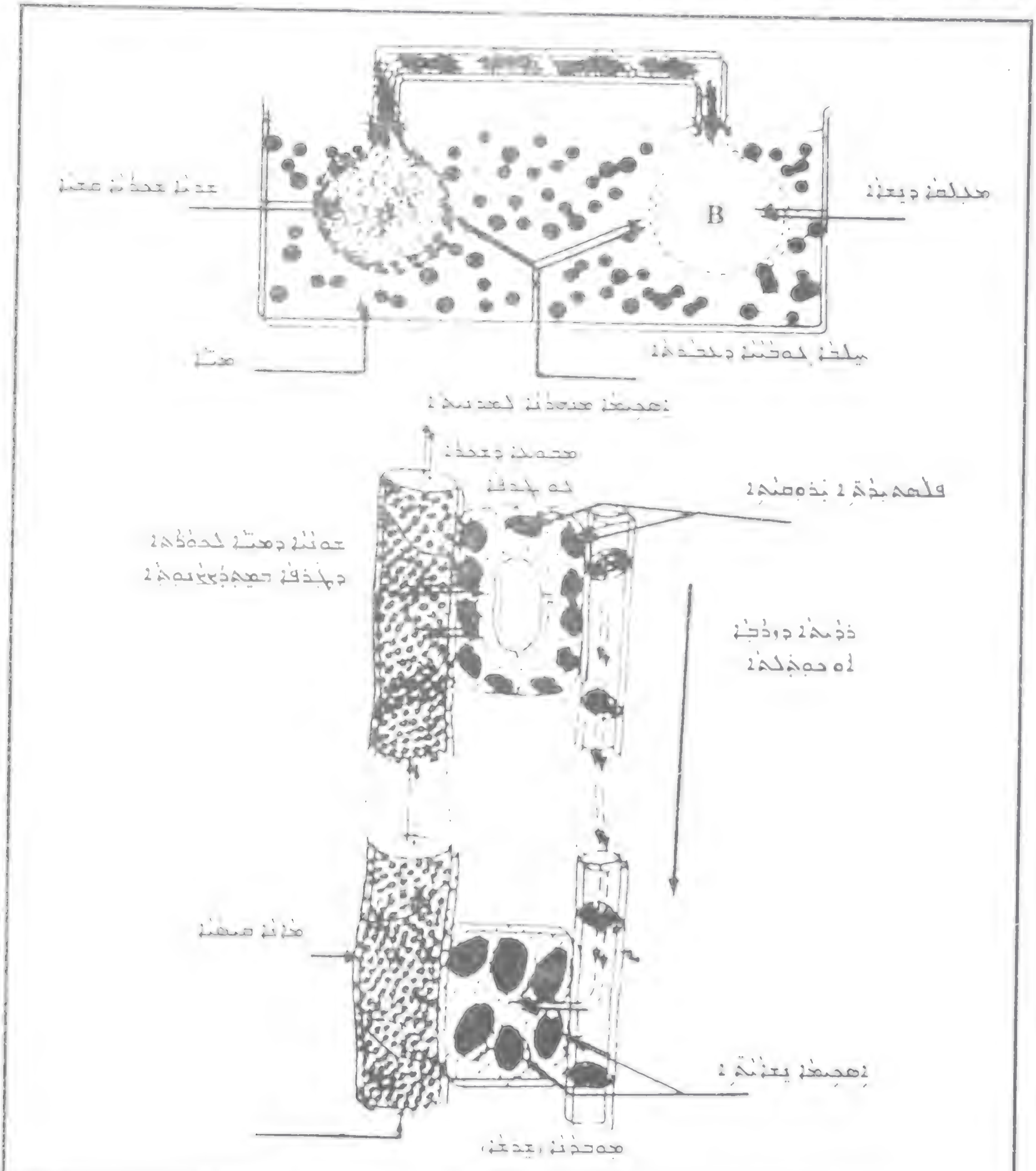


ܨܘܪܬܐ (٢ — ٦) ܬܐܘܪܝܐ ܕܪܕܝܐ ܕܨܝܛܘܦܠܣܡ

ܒ . ܬܐܘܪܝܐ ܕܪܕܝܐ ܕܐܘܠܨܢܐ Pressure Flow Theory ܐܘ ܪܕܝܐ ܕܡܘܙܠܬܐ Mass Flow Theory :

ܦܬܠܗ ܡܘܬܒܬܐ ܐܗܐ ܬܐܘܪܝܐ ܒܝܕ ܝܕܘܥܬܐ ܡܘܢܟ (Munch) ܒܫܢܬܐ ١٩٣٠ . ܘܠܦܘܬ ܕܐܗܐ ܬܐܘܪܝܐ ܡܬܢܝܐ ܢܓܕܐ ܡܣܘܪܐ ܠܗ ܒܝܢܝ ܢܘܕܝ̈ܐ ܠܣܘܪܓܐ ܠܗܢܐ (ܦܘܬܐܣܬܝܐ ، ܒܒܪܟܐ ܠܐܬܘܡܘܬܐ ܒܪܟܠܝܐ . ܒܘܢ̈ܝܐ ܠܒܣܘܪܐ .

ܘܟܝܡܝܐ ܕܟܝܡܝܬܗ ܠܐܢܘܟܐ ܟܝܡܝܝܐ ܡܢܟܐ ܐܝܟ ܢܟܬܐ ܡܢܘܣܬܐ ܕܢܦܘܫܘܬܐ
ܡܬܬܩܢܘܬܐ ܠܗ ܢܘܟܪܐ ܟܝܡܝܝܐ . ܘܗܕܐ ܡܢܟܝܐ ܟܝܡܝܬܐ ܕܦܬܝܐ ܐܠܝܗ
ܒܫܠܝܛܘܬܐ ܡܬܬܩܢܘܬܐ . ܘܗܕܐ ܒܓܘܪܗ ܡܘܟܪܐ ܒܘܪܒܐ ܟܘܡܢܝܢܐ (Turgor
Pressure) . ܘܗܠ ܕܐܗܐ ، ܕܒܐ ܟܘܡܢܝܢܐ ܦܠܝܛܐ ܡܢ ܕܫܠܝܛܘܬܐ ܡܬܬܩܢܘܬܐ .
ܗܘ ܒܠܗ ܟܠܝܬܐ ܟܝܡܝܬܐ ܕܩܕܡܝܬܐ ܕܥܘܒܠܬܐ ܠܟܠ ܡܢ ܡܠܘܐܐ ܡܟܝܟܐ (ܢܟܬܐ)
ܘܡܟܝܟܐ (ܡܝܐ) . ܘܡܫܚܠܦܐ ܐܝܟ ܕܩܝܡܬܐ ܡܢ ܦܝܫܬܐ ܕܡܬܬܩܢܘܬܐ ܕܗܘܕܡܐ (
ܓܕܘܕܐ) . ܘܗܠ ܦܝܫܬܐ ܕܡܦܩܬܗ . ܐܘ ܡܩܠܣܬܗ ܐܝܟ ܒܐܫܟܠܐ (٢ — ٧) .



ܐܫܟܠܐ (٢ — ٧) ܡܢܘܣܬܐ ܠܐܘܪܚܐ ܕܩܝܡܬܐ ܕܓܕܘܕܐ ܐܘ ܟܘܦܠܬܐ .

ܛ ـ ܡܫܡܠܝܘܬܐ ܠܘ ܚܝܘܬܐ :

ܐܘܪܚܐ ܕܡܫܡܠܝܘܬܐ ܗܝ ܕܦܬܓܡܐ ܡܬܘܡܝܘܬܐ ܠܘ ܒܥܒܕܢܘܬܐ ܠܐ ܡܠܝܐ ܠܗܝܡܢܘܬܐ ܕܚܝܘܬܐ ܡܛܠܬ ܗܘܪܐ ܦܪܝܫܬܐ ܗܝ ܕܒܗܘܪܗ ܦܪܝܫܐ ܡܢܗ ܡܢ ܚܝܘܬܐ ܒܪܢܫܐ . ܥܠ ܕܐܝܬ ܦܬܓܡܐ ܡܢܗܘܢ ܕܐܘܪܚܐ ܡܬܕܒܠܝܢ ܒܡܫܡܠܝܘܬܐ ܣܓܝܐܐ ܒܦܠܚܘܬܗ ܘܒܬܪܥܘܬܗ ܥܡ ܥܒܕܐ ܕܢܦܫ ܒܗ . ܚܕܐ ܓܒܘܬܐ ܐܢܫܝܬܐ . ܘܡܬܦܫܛ ܐܝܟ ܥܒܕܐ ܒܗ ܐܢܫܝܐ ܕܐܘܪܚܬܐ ܕܡܫܡܠܝܘܬܐ . ܒܠܝܐ ܕܡܣܬܪܪܐ ܕܡܠܘܐܐ ܡܢ ܕܘܒܪܐ ܕܒܥܒܪܬܗ ܐܘ ܡܬܬܪܓܡܗ ܐܘ ܡܦܫܛܗ . ܠܗܘܢ ܡܣܟܠܢܐ ܕܠܘܥܢܐ . ܘܒܠܒܬܐ ܕܝܠܝܬܐ ܕܦܠܚܐ ܠܐ ܒܠܒܐ . ܐܘ ܢܛܪܘܬܐ ܠܕܘܒܪܐ ܕܦܫܛܗ ܒܪܢܫܐ . ܘܐܘܪܚܬܐ ܕܡܫܡܠܝܘܬܐ ܒܠܚܘܕ ܚܕ ܡܢ ܥܠܬܐ ܕܗܕܝܪܘܬܐ ܘܡܢ ܡܫܡܠܝܘܬܐ ܠܘ ܠܘܥܢܐ ܕܚܝܘܬܐ . ܘܒܥܒܪܘܬܐ ܦܠܚ ܐܘܪܚܬܐ ܕܡܫܡܠܝܘܬܐ ܠܡܦܪܢܣܘ ܕܚܕ ܡܣܬܘܕܐ ܠܚܝܝܐ ܠܒܘܪܟܐ ܕܠܘܥܢܐ .

ܦܬܚ ܡܢܗܘܢ ܐܘܪܚܬܐ ܕܡܫܡܠܝܘܬܐ ܕܗܘܐ ܥܒܘܪܐ ܒܒܘܬܘܐ ܡܢܗ :

ܐ ـ ܙܒܢ ܡܫܟܚܐ ܡܫܡܠܝܬܐ ܠܘ ܒܠܚܘܕ ܗܘܢܐ ܕܠܘܥܢܐ . ܗܘ ܗܕܐ ܒܗܘܠܟܐ ܕܠܒܫܐ ܐܘ ܙܘܥܐ ܠܗܝܢ ܠܠܘܥܢܐ . ܐܘ ܒܥܒܠܐ ܒܡܥܕܪܢܘܬܐ ܡܬܕܒܠܝܬܐ .

ܒ ـ ܡܫܡܠ ܡܠܘܐܐ ܚܠܦ ܚܝܐ ܒܬܫܒܘܚܬܐ ܕܥܒܕܐ ܐܘ ܓܠܝܐ ܒܬܫܪܝܘܬܐ ܦܘܪܫܐ ܐܘ ܒܫܘܚܠܦܐ .

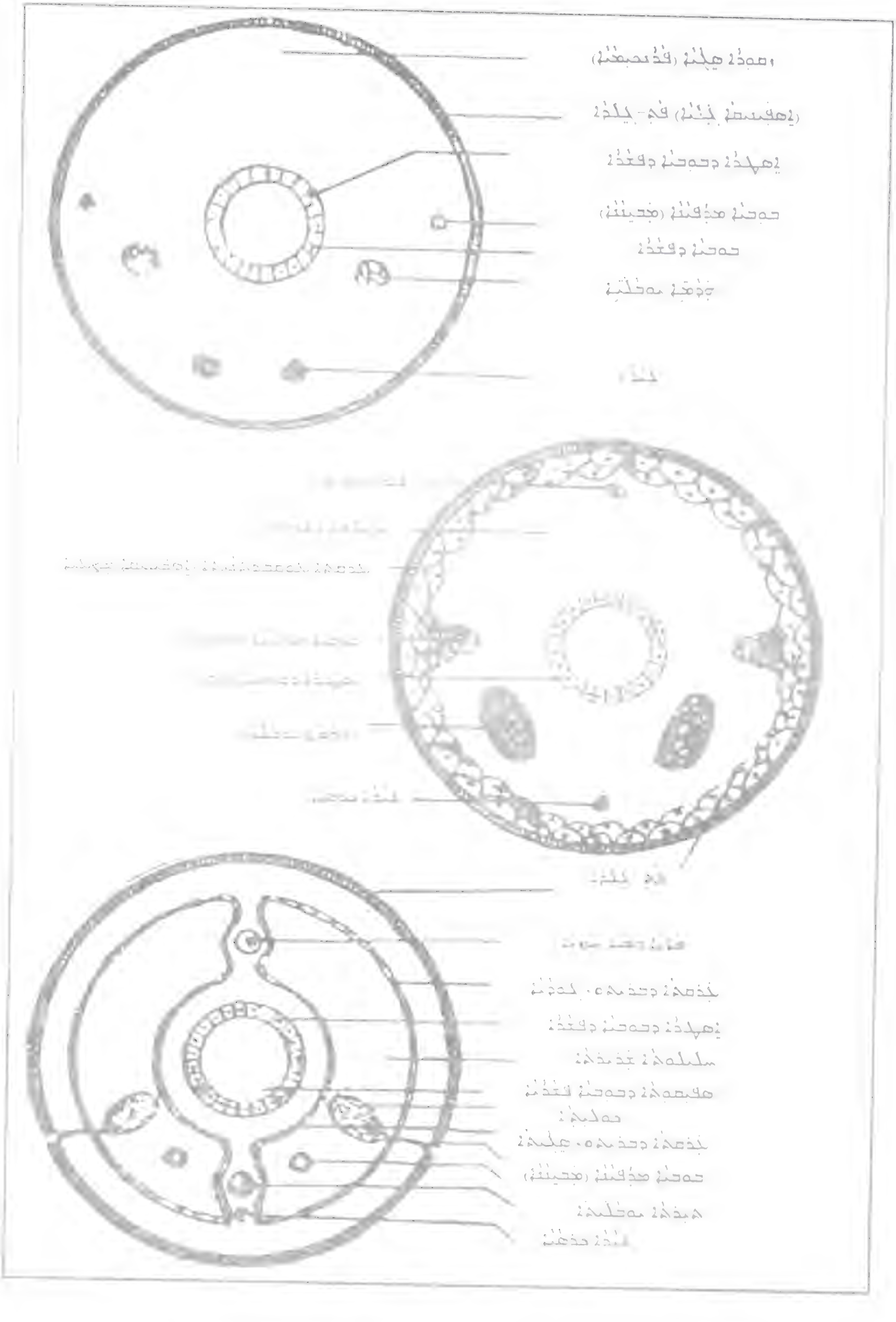
ܓ ـ ܡܛܠ ܒܐܘܪܚܬܐ ܦܬܓܡܐ ܒܚܕܐ ܐܘܪܚܐ ܥܒܕܐ ܡܬܚܙܝܐ ܠܦܠܚܬܐ ܕܦܬܓܡܐ ܡܢ ܦܪܘܫܐ ܐܠܗ . ܘܥܠ ܥܒܕܐ ܕܠܘܥܢܐ . ܐܘ ܗܘܦܟܐ ܕܗܘܢܐ ܒܐܘܪܚܐ ܥܒܕܐ ܒܫܠܡܘܬܐ ܕܗܘܦܐ ܘܒܗܘܦܟܐ ܕܦܠܚܬܐ . ܘܒܕܘܒܪܐ ܕܡܦܫܛܐ ܕܡܠܘܐܐ ܗܪܟܢܐ . ܘܡܬܬܪܓܡܗ ܘܡܦܠܚܗ .

٤ — ١ ـ ܐܕܫܐ ܕܫܠܡܘܬܐ ܠܘܥܢܐ :

ܦܬܚ ܡܡܠܠܐ ܚܝܘܬܐ ܗܠܝܢ ܢܕܥܝܢ ܠܗܘܢ ܫܠܡܘܬܐ ܠܘܥܢܐ ܠܬܠܬܐ ܐܕܫܐ :

١ ـ ܚܝܘܬܐ ܕܠܐ ܫܠܡܘܬܐ : ܠܘ ܐܝܬ ܚܝܘܬܐ ܡܠܝܐ ܪܚܡܬܐ ܕܐܝܬ ܒܗ ܠܥܘܕܪܐ ܕܠܘܥܢܐ ܘܒܕܘܒܪܐ ܦܬܓܡܐ ܒܡܫܘܕܐ ܠܗܝܢ . ܐܝܟ ܗܘܠܟܐ ܕܒܥܒܝܐ ܐܝܟ ܠܘ ܒܬܫܒܘܚܬܐ (2 ـ ١٨) (١) .

٢ ـ ܚܝܘܬܐ ܡܠܐܝ ܫܠܡܘܬܐ ܓܪܓܬܐ : ܦܪܝܫܐ ܡܢܐ ܐܝܬ ܚܝܘܬܐ ܒܥܒܕܗ ܥܠ ܫܠܡܘܬܐ ܢܟܠܬܐ ܡܢ ܒܬܫܒܘܚܬܐ ܠܗܝܢ . ܘܒܬܫܒܘܚܬܐ ܡܫܟܚܐ . ܐܝܟ ܠܘ ܗܘܠܟܐ ܒܥܒܝܐ . ܘܐܦ ܗܝ ܠܐ ܠܘ ܡܕܥܢܐ ܒܒܕܝܐ ܐܝܟ ܒܬܫܒܘܚܬܐ (٢ ـ ١٨) (٢) .



ܨܘܪܬܐ (٢ ـــ ١٨ ܐ) ܦܠܓܐ ܥܒܪܐ ܕܫܠܒܘܬܐ ܒܙܒܢܐ ܕܚܒܠܐ

٣ . ܚܝܘܬܐ ܥܡ ܚܠܠܘܬܐ ܬܪܝܨܬܐ : ܘܠܗܘܢ ܚܝܘܬܐ ܢܦܠܬܐ ܚܠܠܘܬܗܘܢ ܠܓܘܫܡܐ ܠܗ ܐܦܝܬܝܠܝܐ ܡܣܟܢܐ . ܘܡܬܩܪܝܐ ܚܠܠܬܐ ܕܪܝܫܗ . ܐܝܟ ܕܐܝܬܘ ܠܗ ܒܥܠܕܪܐ ܚܠܠܘܬܐ ܘܪܟܝܟܐ ܘܡܬܪܟܢܐ ܘܡܬܟܢܫ . ܨܘܪܬܐ (٢ ـ ١٨) (٣) .

ܡܢ ܚܝܘܬܐ ܕܫܘܝܢ ܠܗ ܚܘܠܐ ܟܠܗ ܚܠܠܘܬܐ (Acoelomates) ܒܪܘܟܐ ܘܡܘܟܠܐ ܡܬܟܠܐ . ܐܝܟ ܚܝܘܬܐ ܠܓܘܫܡܐ ܠܚܘܬܐ ܐܣܪܝܬܐ ܐܝܬ ܒܚܕܐ ܕܘܟܐ ܡܬܚܫܒܬܐ . ܐܝܟ ܚܠܠܘܬܐ ܕܪܝܫܐ . ܐܘ ܐܦܠܝܢ ܡܢܝܢܐ . ܘܦܝܫ ܦܪܝܫܐ ܒܐܘܪܚܐ ܡܢ ܚܝܘܬܐ ܘܫܘܝܢܐ . ܗܘ ܕܐܝܬܘ ܒܥܕܢܐ ܡܣܬܢܝܢܐ ܥܠ ܚܘܠܐ ܒܚܕ ܘܫܘܝܐ ܡܕܡܝܐ ܐܝܟ ܕܒܝܬ ܒܝܬܘܢ .

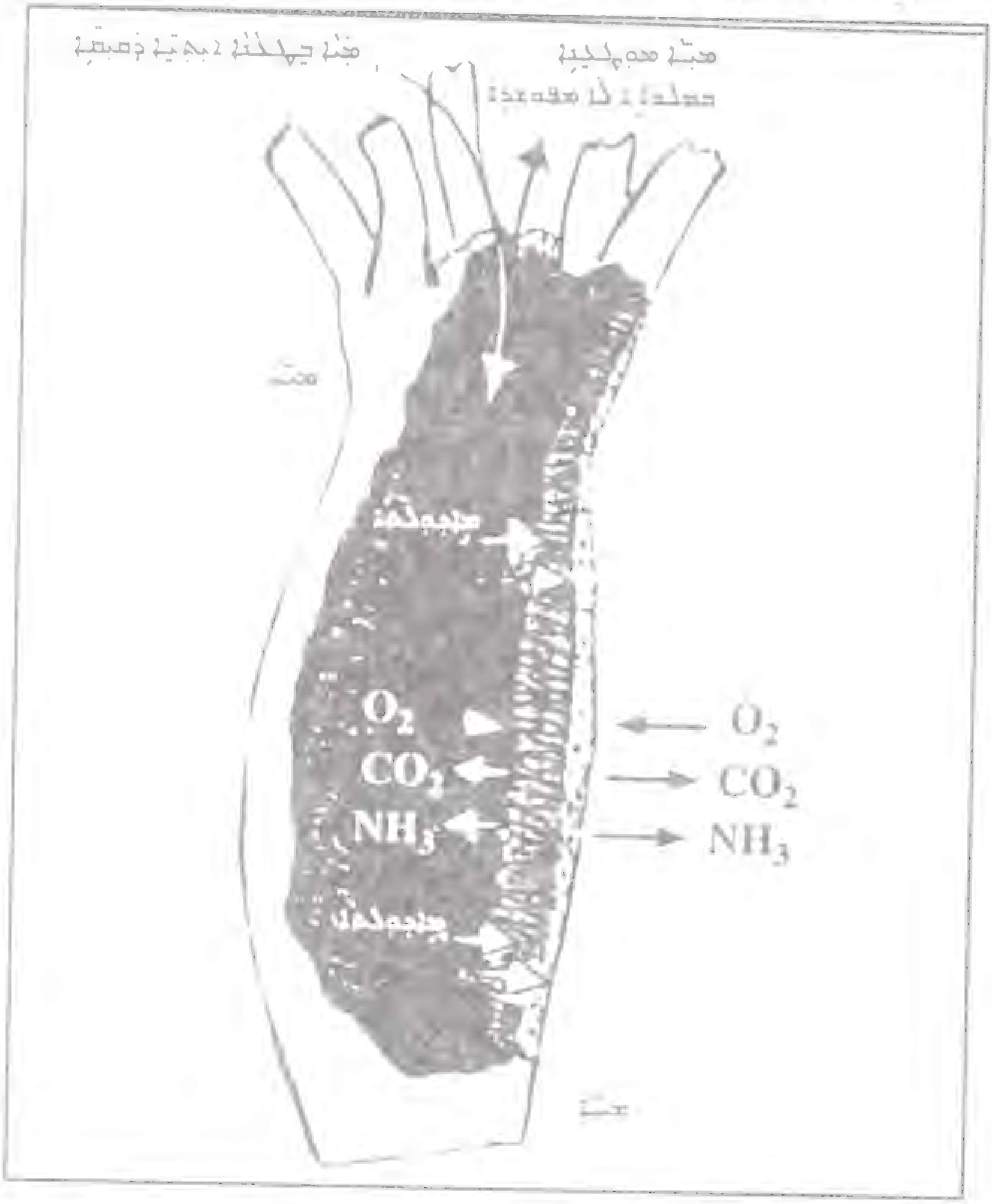
ܘܡܬܘܪܝܐ ܠܗ ܐܦܠܝܢ ܡܢܝܢܐ ܡܢ ܚܕ ܐܘܪܚܐ ܐܪܝܟܘܬܢܐ ܐܘ ܬܪܝܢ ܘܐܘܪܚܐ ܘܐܘܪܚܘܬܐ ܐܣܪܝܐ ܡܛܠ ܠܓܠܝܐ ܕܓܘܫܡܐ ܦܪܝܫܐ ܡܢ ܡܕܡܐ . ܘܡܛܠ ܚܠܠܘܬܐ ܕܓܘܫܐ ܠܒܪ ܥܠ ܓܦܪܬܐ ܘܐܦ ܙܪܥ . ܡܢܝܢܐ ܟܠܗܝܢ ܐܝܬ ܦܪܝܫ ܕܫܘܝܐ ܒܣܪܝܬܐ ܐܦܝܬܝܠܝܐ . ܐܘ ܟܠܗܝܢ ܡܛܠ ܒܡܢܝܢܐ ܐܣܪܝܐ . ܡܟܐ ܘܡܟܐ ܠܗ ܡܢܝܢܐ ܒܪ ܕܡܐ ܡܬܚܫܒ ܕܡܐ ܠܡܕܡܐ . ܘܗܢܐ ܦܪܫܐ ܠܗ ܡܬܚܫܒ ܒܫܘܪܝܐ ܕܡܐ ܕܕܡܐ (Closed Circulation) ܐܝܟ ܒܓܘܠܓܠܬܐ ܕܪܕܝܐ . ܐܘ ܟܠܗܝܢ ܡܛܠ ܦܪܝܫܐ ܒܚܝܘܬܐ ܕܡܢܐ . ܗܢܘܢ ܒܡܕܡܐ ܐܪܥܐ ܕܡܕܡܐ . ܡܢܝܢ ܠܚܘܠܬܐ ܕܚܠܠܘܬܐ ܕܓܘܫܡܐ . ܐܝܟ ܠܗ ܬܪܝܢܐ . ܘܗܘܐ ܠܗܘ ܦܪܫܐ ܕܡܬܩܪܐ ܒܚܠܠܘܬܐ ܕܕܡܐ (Haemocoel) . ܘܫܘܪܝܐ ܒܫܘܪܝܐ ܦܬܝܚܐ (Opencirculation) .

٤ ـ ٢ ـ ܡܬܟܠܢܘܬܐ ܠܗ ܗܘܝܐ :

ܠܝܬ ܠܗ ܗܘܝܐ ܐܦܠܝܢ ܕܡܬܟܠܢܘܬܐ . ܘܟܠ ܚܕ ܦܪܝܫܬܐ ܡܬܘܪܝܐ ܕܡܬܟܠܢܘܬܐ ܠܐܝܬ ܐܚܐ ܡܢܗ ܠܗ ܒܬܪܝܢܬܐ . ܒܕ ܡܘܪܟܐ ܚܕܐ ܟܠܗ ܒܗܘܝܐ ܕܗܘܐ ܡܬܕܒܪܢܝܬܐ ܥܡ ܡܫܘܚܬܐ . ܗܕܟܐ ܥܠܝܗ ܐܦ ܡܬܝܢܝܬܐ ܡܢ ܡܣܟܬܐ ܕܗܘܐ ܥܠܝܗ ܒܚܠܠܘܬܐ (ܨܘܪܬܐ ٢ ـ ٨ ܒ)

ܐܦ ܦܪܫܝ ܡܠܘܐܐ ܗܘܪܡܢܐ ܡܬܦܪܫܐ ܡܢ ܗܘܝܐ ܕܥܪܩܘܬܐ ܒܪܫܝܬܐ ܠܗܘܝܐ ܐܣܪܝܬܐ Gsatrodermil Cells . ܐܝܟ ܟܠ ܚܕܐ ܡܬܝܢܝܬܐ ܠܡܠܬܐ ܕܡܬܦܠܓܬܐ ܘܦܪܫܬܐ . ܘܡܬܦܫܩ ܒܐܗܐ ܗܘܝܐ ܕܟܠܐ ܡܬܟܠܐ

Mesoglea ، ܡܫܐ ܚܒܝܫܘܬܐ ܡܫܚܬܐ ܢܦܠܬܐ ، ܐܘ ܒܐܘܪܚܐ ܕܠܒܪܐ
ܦܪܘܦܘܠܘܡܐ ، ܕܡܫܡܠܐ ܠܥܒܕܬܐ ܕܢܫܡܬܐ ܒܟܠ ܓܠܕܐ .



ܨܘܪܬܐ (٢ ـ ٨ ب) ܚܘܠܦܐ ܕܓܠܐܐ ܒܝܢ ܗܝܕܪܐ ܘܡܝܐ ܕܚܕܪܘܗ̇ .

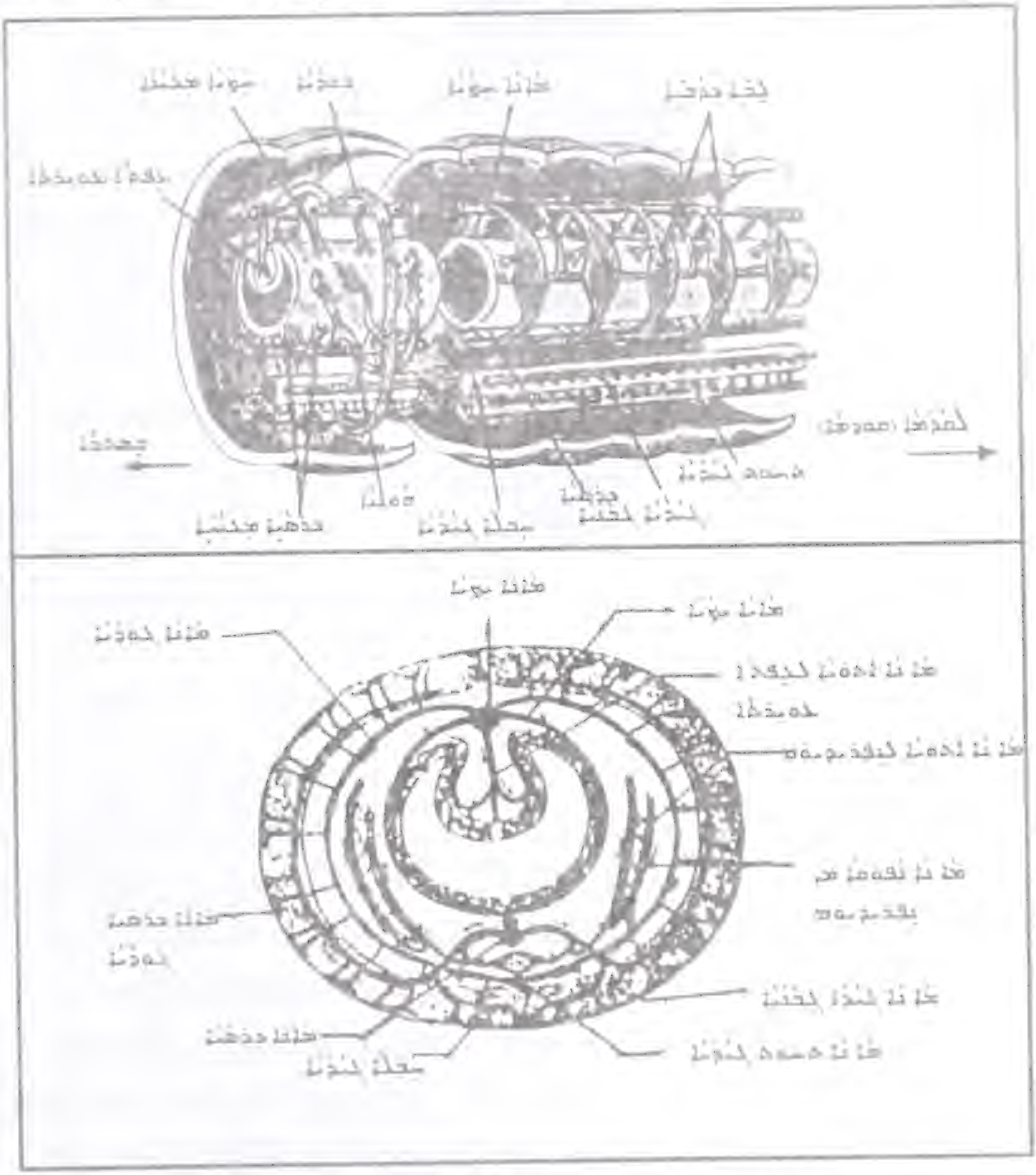
٤ ـ ٣ ـ ܡܫܘܠܡܘܬܐ ܠܗ ܬܘܠܥܬܐ ܕܐܪܥܐ :

ܬܘܠܥܬܐ ܕܐܪܥܐ ܐܝܬ ܒܗ̇ ܓܘܫܡܐ ܪܛܝܒܐ ، ܘܡܘܒܠܐ ܠܗ ܐܘܪܚܬܐ ܕܡܫܘܪܝܐ
ܒܗ̇ ܡܢ ܐܠܗܐ ܡܫܝܐ ܐܪܥܢܝܬܐ ܕܥܠܝܐ ، ܐܝܟ ܕܝܢܗ ܚܘܫܐ ܘܡܦܩ ܐܢܘܢ ܒܓܠܕܐ .
ܡܗܝܪ ܠܝܬ ܡܫܝܐ ܥܠ ܐܪܥܢܝܬܐ ܕܠܒܫܐ ܡܘܕܥܢܐ ، ܘܡܫܚܠܦ ܒܓܠܕܐ ܠܗ ܟܠ ܚܕܐ
ܢܫܡܬܐ ܒܡܫܝܐ ܢܫܡܬܢܝܬܐ ܒܓܘܫܡܐ ܒܪܝܬܐ ܒܫܘܠܡܬܐ ܘܠܒܪܐ ܕܠܒܫܐ .
ܡܫܐ ܫܘܚܠܦܐ ܒܝܢ ܓܒܝܬܐ ܠܗ ܕܡܫܝܐ ، ܘܬܐܠ ܥܠ ܒܓܘܫܐ ܦܪܝܐ ܘܗܘ ܥܠܗ ܕܩܘܬܐ .
ܘܡܢܝܢ ܝܡܝܢ ܡܫܚܢ ܠܡܫܡܫܬܐ ܕܐܘܪܚܐ ܕܓܘܫܐ ، ܘܚܕܐ ܡܩܘܕܫܐ ܠܗ ܡܫܝܐ ܫܘܚܠܦܐ ܡܢ
ܓܘܫܐ ، ܘܐܙܠ ܠܡܘܫܐ ܒܡܫܡܫܐ ܕܠܒܐ (ܓܠܕܐ) ، ܕܐܝܟ ܓܘܫܐ ܠܡܘܫܐ . ܘܗܘ ܡܢܗ

ܒܢܘܼܢܵܐ ܦܘܼܠܚܵܢܵܐ ܕܒܘܼܚܵܢܵܐ ܕܠܸܒ̣ܵܐ . ܘܟܠܗܿ ܩܢܵܝܵܐ ܚܸܘܵܪܵܐ ܕܒܘܼܚܵܢܵܐ ܦܬܵܟ̣ܵܪܵܐ ܡܫܘܼܚܠܸܦ ܡܢ ܦܸܠܓܵܐ ܠܚܘܼܪܵܢܵܐ ، ܟܕ ܦܵܪܹܫ ܡܢܹܗ ܒܝܠܕܵܐ (ܩܵܪܵܒ̣ܬܵܐ) .

ܢܦܸܠ ܩܢܵܝܵܐ ܓܵܘܵܝܵܐ ، ܗܵܢܵܐ ܕܩܢܵܝܵܐ ܠܒ̣ܝܼܫܘܼܬ݂ܵܐ ، ܗܵܘܹܐ ܒܘܼܚܵܢܵܐ ܦܬܵܟ̣ܵܪܵܐ ، ܘܩܸܪܝܵܐ ܒܹܗ ܒܩܵܪܵܒ̣ܬܵܐ ، ܘܡܸܬ݂ܦܲܠܓ̣ܝܼܢ ܠܓܵܘܵܝܵܐ ܕܲܥܒ̣ܵܐ . ܐܝܼܬ݂ ܩܢܵܝܵܐ ܠܒ̣ܝܼܫܘܼܬ݂ܵܐ ܗܘ ܠܒ̣ܵܬ݂ܵܐ ، ܗܘܼ ܒܠܗܿ ܩܢܵܝܵܐ ܗܵܘܹܐ ܠܸܓ̣ܦܵܐ ، ܘܗܘܼ ܒܹܝܬ݂ ܘܫܘܼܦܵܐ ܡܠܹܗ ܡܢ ܓܵܘܵܝܵܐ ، ܘܢܦܸܠ ܗܵܘܹܐ ܣܢܵܝܵܐ ܠܸܓ̣ܦܵܐ ܡܫܘܼܬܵܦܵܐ . ܘܟܠܗܿ ܓܘ ܡܫܲܚܠܦܵܐ ܕܠܒ̣ܝܼܫܘܼܬ݂ܵܐ ، ܘܡܸܬ݂ܦܲܠܓ̣ܝܼܢ ܦܵܪܘܵܐ ܕܲܥܒ̣ܵܐ ܠܗ ܦܘܼܠܚܵܢܵܐ

ܘܩܵܪܹܐ ܐܝܼܬ݂ ܗܵܕܹܐ ܩܢܵܝܵܐ ܕܩܸܪܝܵܐ ܠܒ̣ܝܼܫܘܼܬ݂ܵܐ ܐܲܚܪܹܝܵܐ ܢܦܸܠ ܗܵܕܹܐ ܓܘ ܠܸܓ̣ܦܵܐ ܕܣܢܵܝܵܐ ܠܸܓ̣ܦܵܐ ܦܫܝܼܛܵܐ ܡܢܹܗ ܒܝܬ݂ܵܝܵܐ ܒܗܵܕܹܐ ܩܢܵܝܵܐ ܠܸܓ̣ܦܵܝܵܐ ܠܸܓ̣ܦܵܝܬܵܐ . ܘܩܵܪܹܐ ܓܘ ܗܵܕܹܐ ܠܸܓ̣ܦܵܝܬܵܐ ܕܗܵܘܹܐ ܠܚܘܼܪܵܢܵܐ ܠܒܘܼܚܵܢܵܐ ܦܬܵܟ̣ܵܪܵܐ ، ܗܵܕܹܐ ܩܢܵܝܵܐ ܒܓܵܘܹܗ ܒܩܸܪܝܵܐ ܠܸܓ̣ܦܵܝܬܵܐ .(ܨܘܼܪܬܵܐ ٢ - ٩)



ܨܘܼܪܬܵܐ (٢ – ٩ ، ܒ) ܡܫܲܚܠܦܘܼܬ݂ܵܐ ܠܗ ܦܘܼܠܚܵܢܵܐ ܕܓܵܘܵܝܵܐ .

ܠܓܕܒ ܩܪ̈ܝܐ ܐܫܦܪܐ ܚܠܘܡܬ̈ܢܝܐ ܣܓܝܐ ܠܗܘܡܐ ܐܝܬ ܠܗ ܟܠ ܚܠܘܡܬܐ ܡܢ ܚܠܘܡܬ̈ܢܐ ܕܠܗܘܡܐ ، ܡܢ ܩܪ̈ܝܐ ܚܘܪ̈ܐ ܠܩܪ̈ܝܐ ܒܪ̈ܫܝܐ ، ܐܘ ܩܪ̈ܝܐ ܗܣܘܗ ܠܢܘܪܐ . ܘܪܚܝܫܝܢ ܢܩܬ̈ܐ (ܘܠܗ ܢܒܪܡܐ ܐܪ̈ܓܐ ܘܡܝܢܣܪ ܝܕ ܚܢܐ) ܬܗܐ ܘܗܝܐ ܡܢ ܐܝܟ ܩܪ̈ܝܐ ܐܫܦܪܐ ܠܗ ܚܠܘܡܬܐ ܥܒܝܠܬܐ ܗܝܠ ܣܪܓܫܒܪܬܐ ܐܘ ܗܪܓܫܒܪܬܐ ، ܘܦܬܚܝܢ ܪ̈ܦܦܬܢܝܐ ܘܡܪܘܪܐ ܕܘܡܝܐ ، ܘܦܬܚܝܢ ܒܕܒܪܐ ܒܬܘܢ ܝܕܪ̈ܐ ܕܠܒ̈ܐ ܟܕ̈ܒܐ (Pseudohearts) . ܐܫܬܝܢ ܩܪ̈ܝܐ ܐܫܦܪܐ ܠܗܕܢ ܩܪ̈ܝܐ ܢܬܝܠܐ ܠܢܬܢ̈ܝܐ ܒܩܪ̈ܝܐ ܗܣܘܗ ܠܢܘܪܐ ، ܠܗ ܡܝܚܕܐ ܠܩܘܡܝܐ ܕܠܗܘܡܐ .

ܘܐܝܬ ܩܪ̈ܝܐ ܠܗܘܪܐ ، ܐܘ ܐܫܦܪܐ ܚܘܪܐ ـ ܗܣܘܗ ܠܢܘܪܐ ، ܠܗ ܡܝܚܕܐ ܢܩܒܠܐ ܬܪܬܝ ܚܠܘܡܬܐ ܕܗܪܓܫܒܪܬܐ ، ܘܥܠ ܠܢ̈ܫܐ ܝܗܒܐ̈ܢܐ ܡܢ ܣܝ̈ܓܐ (Septa) ، ܘܐܝܬ ܐܫܬܝܢ ܩܪ̈ܝܐ ܚܘܪ̈ܐ ܒܩܪ̈ܝܐ ܗܣܘܗ ܠܢܘܪܐ (ܨܘܪܬܐ ٢ ـ ٩) ، ܐܝܟܐ ܡܩܘܣ ܥܠ ܝܗܒܐ ܠܩܘܡܝܐ ܠܣܝܓ̈ܐ ، ܐܝܟ ܘܗܝܐ ܡܢ ܩܪ̈ܝܐ ܒܪ̈ܫܝܐ ܠܗܘܪܐ . ܘܐܝܬ ܒܠܒܘܫ ܩܪ̈ܝܐ ܕܦܪܝܫܝܢ ܡܢ ܩܪ̈ܝܐ ܒܪ̈ܫܝܐ ، ܘܗܘܝܢ ܠܗ ܐܪܒܥܐ ܡܘܬܢܝܐ ، ܒܠܒܘܪܐ ܕܠܗܘܡܐ ܐܝܟܐ ܕܥܕܐ ܗܘܡܐ .

ܐܝܟ ܪܘܪܒܬܐ ܐܘ ܐܪܒܥܐ ܩܪ̈ܝܐ ܠܓܕ ܘܗܘܝܐ ܡܕܡܐ ܠܒܘܫܐ ܦܬܚ̈ܐ ، ܐܫܬܐ ܒܩܪ̈ܝܐ ܚܘܪ̈ܐ ܘܒܪ̈ܫܝܐ ، ܒܗܕܝ ܘܗܝܐ ܡܢ ܩܪ̈ܝܐ ܒܪ̈ܫܝܐ ܡܢܫܝܐ ܒܟܠ ܚܠܘܡܬܐ . ܐܦ ܡܪܘܪܘ ܩܪ̈ܝܐ ܚܘܪ̈ܐ ܝܘܗܐ ܒܗܒܕܬܐ (ܗܝܡܘܓܠܘܒܝܢ) ܒܕܡܐ ، ܒܪܘܚܐ ܕܗܠܬܐ ܩܪ̈ܝܐ ܒܟܠ ܚܠܘܡܬܐ . ܘܡܒܕܬܐ ܡܪܘܪܘ ܩܪ̈ܝܐ ܒܪ̈ܫܝܐ ܝܩܕܒܪ̈ܐ ܒܩܪ̈ܝܐ ܕܡܢܐ ، ܗܦܟܝܢ ܠܐܪܒܥܐ ܡܘܬܢܝܐ . ܘܗܘܕܝܐ ܒܣܘܣ ܕܩܪ̈ܝܐ ܚܘܪ̈ܐ ܡܝܢ ܒܪܘܡܐ ܕܠܒ̈ܐ ܠܗ ܗܘܠܒܬܐ ܕܐܪ̈ܥܐ . ܡܫܚܠܦܢܘ ܒܬܪܐ ܦܘܠܫܢܐ ܠܝܟܐ ܒܪ̈ܝܬܐ ، ܐܝܟ ܕܡܫܚܠܦ ܠܕܡܐ ܠܓܢ̈ܒܐ ܒܪ̈ܫܝܐ ܡܢ ܠܗܘܡܐ . ܐܘܡܝܢ ܩܪ̈ܝܐ ܒܪ̈ܫܝܐ . ܘܡܫܬܦܩܝܢ ܐܣܪ̈ܐ ܝܕܢ̈ܝܐ ܪ̈ܥܝܐ ، ܗܘ ܕܡܦܠܓ ܕܡܐ ܥܠ ܗܪܓܫܐ ܡܫܚܠܦ ܕܠܗܘܡܐ . ܘܪܘܪ ܕܡܐ ܠܗܘ ܡܢ ܠܩܘܡܝܐ ܠܝܗܒܪܬܐ . ܐܝܟܐ ܩܪ̈ܝܐ ܗܣܘܗ ܠܢܘܪܐ ، ܗܘ ܒܠܗ ܦܪܒܕܐ ܪ̈ܥܝܐ ، ܘܐܦ ܡܫܬܐ ܕܡܐ ܠܝܗܒܪܬܐ . ܘܡܫܚܝܢ ܩܪ̈ܝܐ ܐܫܦܪܐ ܚܠܘܡܬ̈ܢܝܐ ، ܢܩܒܠܐ ܬܪܬܝ ܢܬܝܠܐ ܒܡܫܚܠܦܬܐ ܕܕܡܐ ܠܩܪ̈ܝܐ ܚܘܪ̈ܐ ، ܘܡܫܕܪ ܕܡܐ ܒܗܪܓܐ ܐܢܒܘܒܐ ܦܠܓܐ ، ܘܡܫܐ ܒܡܫܘܬܐ ܬܘܦܪܬܐ ܡܢ ܗܘܒܠܬܐ ܡܢܝܢܐ ܠܗ ܦܠܘܡܐ .

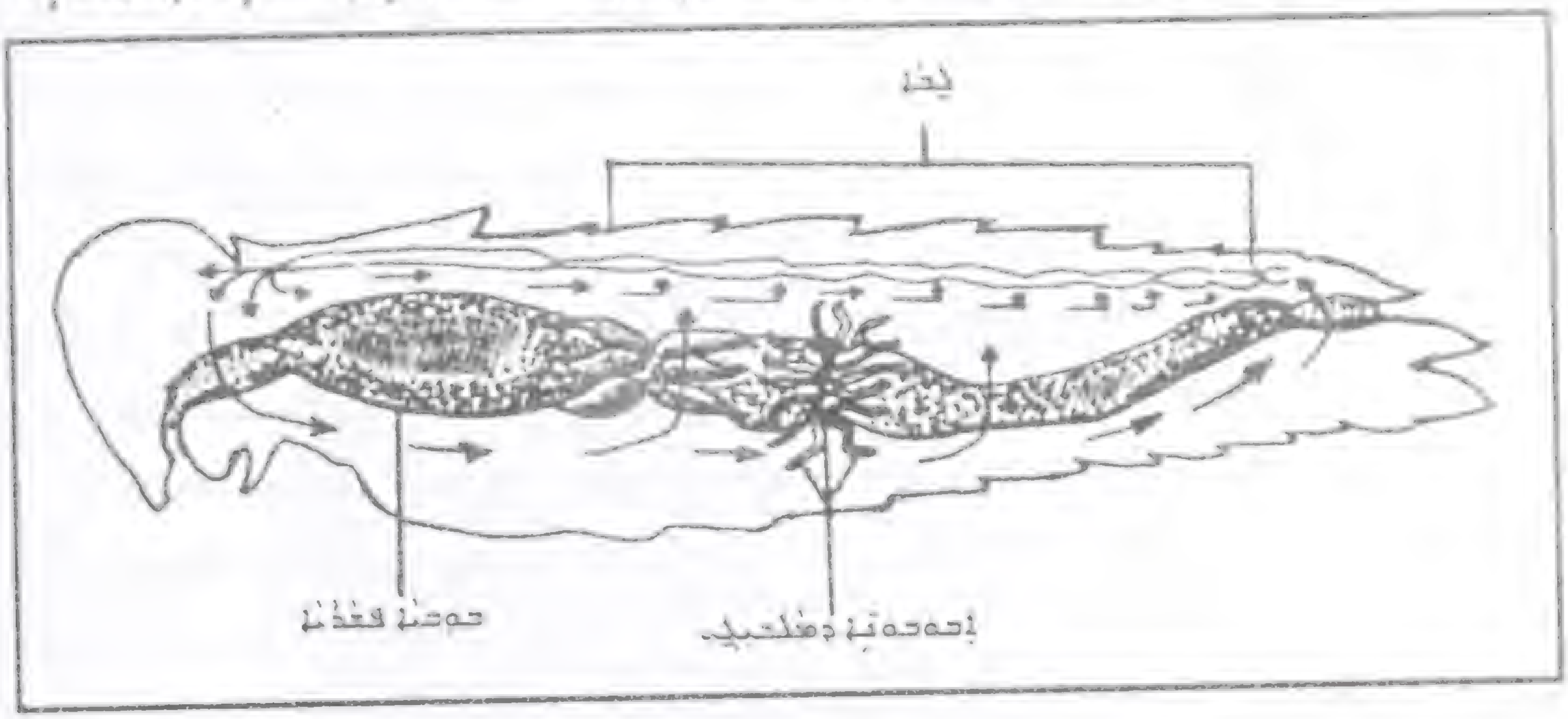
٤ — ٤ - ܡܗܠܟܢܘܬܐ ܠܗ ܩܡܨܐ :

ܐܦܠܚܐ ܕܡܘܪܕܐ ܠܗ ܩܡܨܐ ܒܠܗ ܡܢ ܐܪ̈ܚܐ ܦܬܝܚܐ ، ܘܐܝܬܠܗ ܣܠܝܠܘܬܐ ܕܡܫܬܐ ܦܠܓܐ ܠܓܝܢ̈ܝܐ ܕܝܣܬܐ ܦܪܝܫܐ ܡܢ ܣܕܪܐ ܡܢܬܢ̈ܝܐ ܦܪܫ ܓܝܣ̈ܐ ܗܡܘܕܢܝܐ (Pericardial Sinus) ܒܗܢܝܐ ܒܘܣܒܕܐܢܝܐ ܘܗܝܐ ، ܡܢ ܣܠܝܠܘܬܐ ܕܦ ܓܒܪܐ ܪ̈ܥܝܬܐ ؛ ܦܓܪܐ ܠܗ ܒܘܒܠܐ ܓܝܣܐ ܦܪܝܫܐ ܒܠܝܗ ، ܘܒܠܗ ܢܩܒܠܐ ܗܣܘܗ ܓܝܣ̈ܐ ܗܡܘܕܢܝܐ ، ܒܓܝܣ̈ܐ ܣܓܝ ܠܗܢ̈ܐ (Perivisceral Sinus) ܘܦܪܝܫܐ ܒܠܗ ܐܘܐ ܡܢ ܓܝܣ̈ܐ ܒܪ̈ܫܝܐ (Ventral Sinus) ܕܒܠܗ ܢܩܒܠܐ ܗܣܘܗ ، ܒܗܢܝܐ ܒܘܣܒܕܐܢܝܐ ܒܪ̈ܫܝܐ .

ܠܒܐ ܒܠܗ ܐܪܘܟܐ ܚܘܪ ܕܘܡܐ ، ܩܘܣ ܠܗ ܗܢܕ ܚܠܘܡܬܐ ܡܘܡܢܝܐ ، ܘܐܝܬܠܗ ܝܗܒܐ ܠܢ̈ܫܐ ܘܗܝܐ ، ܦܬܚܐ ܝܬܐ ܒܘܒܠܐ ܒܚܘܡܘܒܐ (Ostia) ، ܠܟܕ ܒܚܘܕܪܫ ܕܡܐ ܡܢ ܠܒܐ . ܘܐܝܬ ܡܪܘܪܐ ܝܬܐ ܒܗܘܡܐ ܡܫܠܚ ܕܠܓܕܐ ܕܕܡܐ ܒܓܝܣ̈ܐ ܕܡܩܘܡܐ ܚܕܘܟ ܠܒܐ

ܕܡܵܐ ܠܩܘܼܕܡܵܐ ܠܥܘܼܡܪܵܐ . ܘܗܘܿ ܝܠܹܗ ܡܫܘܼܚܠܦܘܼܬܵܐ ܠܥܘܼܡܪ̈ܵܐ ܕܠܒܵܐ . ܘܡܫܲܦܫܸܦ ܡܵܪ̈ܵܐ ܠܣܘܿܟ݂ܵܢ̈ܵܐ ܓܵܘ ܓܘܼܫܡܵܐ . ܘܕܘܿܟ݂ ܕܡܵܐ ܓܵܘ ܩܲܕܡܵܝܵܐ ܠܥܘܼܡܪܵܐ ܡܼܢ ܠܥܘܼܡܪܵܐ . ܘܟܲܦܹܐ ܟܣܝܵܬܵܐ ܕܪܸ̈ܓܠܹܐ . ܘܕܘܿܟ݂ ܠܟܘܼܠܗܘܿܢ ܓܵܘ ܗܵܕܹܐ ܓܢܵܒ݂ܵܐ ܣܘܼܦ ܓܵܘ ܗܵܘ ܡܕܪ̈ܵܫܵܐ . ܟܠܵܐ ܘܦܵܫ ܡܲܫܪܹܐ . ܓܵܘ ܟܣܝܵܬܵܐ ܕܡܲܕܪ̈ܵܫܵܐ ܘܟܠܵܐ ܠܓܢܵܒ݂ܵܐ ܕܡܲܕܪܵܫܵܐ . ܘܡܼܢܹܗ ܠܠܒܵܐ ܓܵܘ ܗܵܝ ܕܪܸ̈ܓܠܹܐ . ܡܼܢ ܓܵܘ ܦܘܼܫܵܩܵܐ (ܨܘܼܪܬܵܐ ٢ - ١٠) .

ܚܕܵܐ ܡܼܢ ܕܡܵܐ ܠܗܵܕܹܐ ܓܵܘ ܠܦܘܼܬܵܐ ܘܗܵܕܹܐ ܓܲܢܒܵܐ . ܘܕܡܵܐ ܕܟܘܼܠܗܘܿܢ ܡܢܵܬ̈ܵܐ ܡܫܲܚܠܦܵܬ̈ܵܐ . ܐܝܟ ܚܕ݂ܕܡܵܐ ܕܟܣܝܵܐ ܓܵܘ ܦܘܼܫܵܩܵܐ ܡܫܲܚܠܦܬܵܐ ܡܼܢ ܓܘܼܫܡܵܐ . ܡܲܡܠܹܐ ܚܲܝܘܼܬܹܗ ܡܼܢ ܠܒܵܐ . ܘܩܲܠܝܼܠ ܠܡܲܕܥܘܼܬܵܐ ܕܦܘܼܪܫܵܢܵܐ ܕܡܵܐ . ܓܵܘ ܢܦܵܩܵܐ ܕܓܘܼܫܡܵܐ . ܐܝܟ ܠܓܲܢܒܵܐ ܘܓܵܘ ܠܦܘܼܬܵܐ .



ܨܘܼܪܬܵܐ (٢ - ١٠) ܐܘܿܪܓܵܢܵܐ ܕܚܘܼܕܵܪܵܐ ܓܵܘ ܚܲܫܪܬܵܐ

٥ - ܡܫܘܼܚܠܦܘܼܬܵܐ ܓܵܘ ܦܪܵܦܪܵܢܝܵܬܵܐ :

ܩܵܡܹܐ ܒܦܠܵܚܬܵܐ ܕܡܫܘܼܚܠܦܘܼܬܵܐ ܓܵܘ ܦܪܵܦܪܵܢܝܵܬܵܐ ܗܵܕܹܐ ܐܘܿܪܓܵܢܹܐ . ܝܠܹܗ ܐܘܿܪܓܵܢܵܐ ܕܕܡܵܐ ܘܐܘܿܪܓܵܢܵܐ ܕܢܦܵܫܵܐ . ܘܗܵܕܹܐ ܐܘܿܪܓܵܢܹܐ ܐܚܝܼܕ݂ܵܐ ܡܢܵܐ ܚܕ݂ ܚܕܵܪܵܐ ܒܦܘܼܠܚܵܢܵܐ ܘܕܘܼܒܵܪܵܐ . ܐܝܟ ܕܒܲܝܬ ܚܘܼܫ ܡܼܢ ܓܵܘ ܕܪܵܓܹܗ .

٥ - ١ – ܐܘܿܪܓܵܢܵܐ ܕܕܡܵܐ Heamal System :

ܐܘܿܪܓܵܢܵܐ ܕܕܡܵܐ ܓܵܘ ܦܪܵܦܪܵܢܝܵܬܵܐ ܕܒܝܼܪܵܐ ܝܠܹܗ . ܘܡܫܲܘܕܥܵܐ ܝܠܹܗ ܡܼܢ ܠܒܵܐ ܕܦܘܼܫܵܐ ܘܥܪܘܿܩܹܐ ܕܡܲܓܹܐ ܠܕܡܵܐ ܠܓܵܢ̈ܵܒܹܐ ܕܓܘܼܫܡܵܐ . ܘܐܲܒ݂ܕܵܐ ܕܡܲܦܩܹܐ ܠܕܡܵܐ ܡܼܢ ܘܵܦܵܐ ܕܓܘܼܫܡܵܐ . ܘܡܲܕܒܪܝܼܠܹܗ ܠܠܒܵܐ . ܘܡܼܢ ܓܲܘܵܐ ܡܼܢ ܡܫܘܼܚܠܦܘܼܬܵܐ ܕܕܡܵܐ . ܐܝܟ ܕܡܲܫܠܹܡ ܠܦܪܘܼܫܵܐ ܕܥܪ̈ܘܿܩܹܐ ܘܟܠܵܐ ܒܲܪܒܵܐ . ܟܠ ܕܐܵܗܵܐ ܦܝܼܫ ܡܫܘܼܚܠܦܵܐ ܐܘܿܪܓܵܢܵܐ ܕܕܡܵܐ ܦܬܝܼܚܵܐ ܓܵܘܵܐ . ܐܘܿܪܓܵܢܵܐ ܠܕܡܵܐ ܡܲܪ̈ܵܐ .

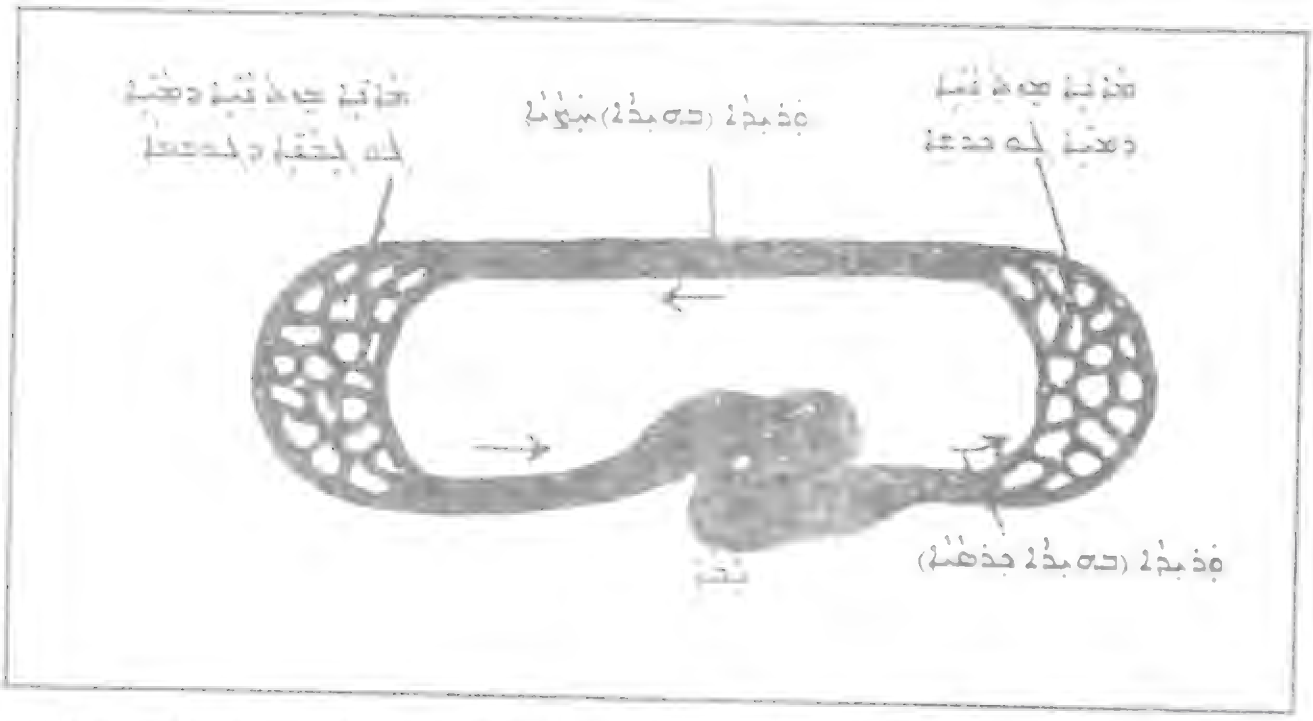
ܦܪܝܼܫܵܐ ܝܠܹܗ ܐܘܿܪܓܵܢܵܐ ܕܚܘܼܕܵܪܵܐ ܓܵܘ ܦܪܵܦܪܵܢܝܵܬܵܐ ܡܼܢܹܗ . ܓܵܘ ܟܠ ܦܪܵܦܪܵܢܝܵܬܵܐ ܗܵܕܹܐ ܢܘܼܩܙܵܐ ܨܘܼܪܬܵܐ ܝܠܹܗ :

ܡܕܢܚܝ : ܗܘܐ ܠܝܬܐ ܠܗ ܦܬܟܪܬܐ ܕܒܝܬ ܕܡܐ ، ܘܠܗ ܠܐ ܦܬܟܪܬܐ ܚܝܘܬ ܕܡܐ .

ܘܟܕܘܢ : ܐܝܬ ܕܡܐ ܒܟܠܝܐ ܕܒܝܬܐ ܡܢ ܠܒܘܫܐ ܕܦܬܟܪܬܐ ܠܟܠܗ - ܘܟܠܝܬܐ ܚܝܘܬܐ ܡܢܗ ܠܟܠܗܘܢ . ܘܗܢܐ ܒܠܗ ܙܘܪܐ ܡܘܕܥܐ ܠܗܘܢܗ ܗܕܟܐ ܠܙܘܥܐ ܕܡܘܕܥܐ ܠܗ ܠܐ ܦܬܟܪܬܐ .

ܘܚܙܝܬܐ ܒܠܗ ܐܒܝܫܬܐ ܕܐܘܪ ܐܝܬ ܕܡܐ ܠܗ ܦܬܟܪܬܐ ܠܟܠܗ ܦܘܠܐ ܐܚܪܢܐ ܘܐܦ ܕܟܘܢܫܐ ܕܦܬܟܪܬܐ ܡܫܠܡܬܐ ܡܚܒܫ ܬܘܣܠܦܐ ܗܠܝܢ . ܘܐܝܬ ܟܕܝ ܦܘܠܐ ܒܠܚܘܕ :

ܐ . ܕܘܪܐ ܕܕܡܐ ܚܕܢܝܐ (Single blood circulation) ܗܝ ܕܐܝܬ ܠܗ ܢܘܢܐ ܟܕܘܢ ܡܢ ܢܘܢܐ ܐܠܗܝܢ . ܘܗܢܐ ܕܘܪܐ ܟܠܝܐ ܕܝܬܐ ܡܚܠ ܠܒܐ ܘܐܒܝܫܐ ܠܐ ܡܫܘܫܬܐ ܕܡܫܕܪܐ ܠܗ ܠܟܠܗ ܠܗ ܢܘܫܡܐ . ܕܟܕ ܗܘܣܠܦܐ ܕܗܘܦܐ ، ܘܡܢ ܟܕ ܦܝܫ ܡܫܘܚܠܦܐ ܕܡܐ ܟܠ ܗܘܦܐ ܡܫܠܦܐ ܕܠܘܚܡܐ . ܨܘܪܬܐ (٢ - ١١)

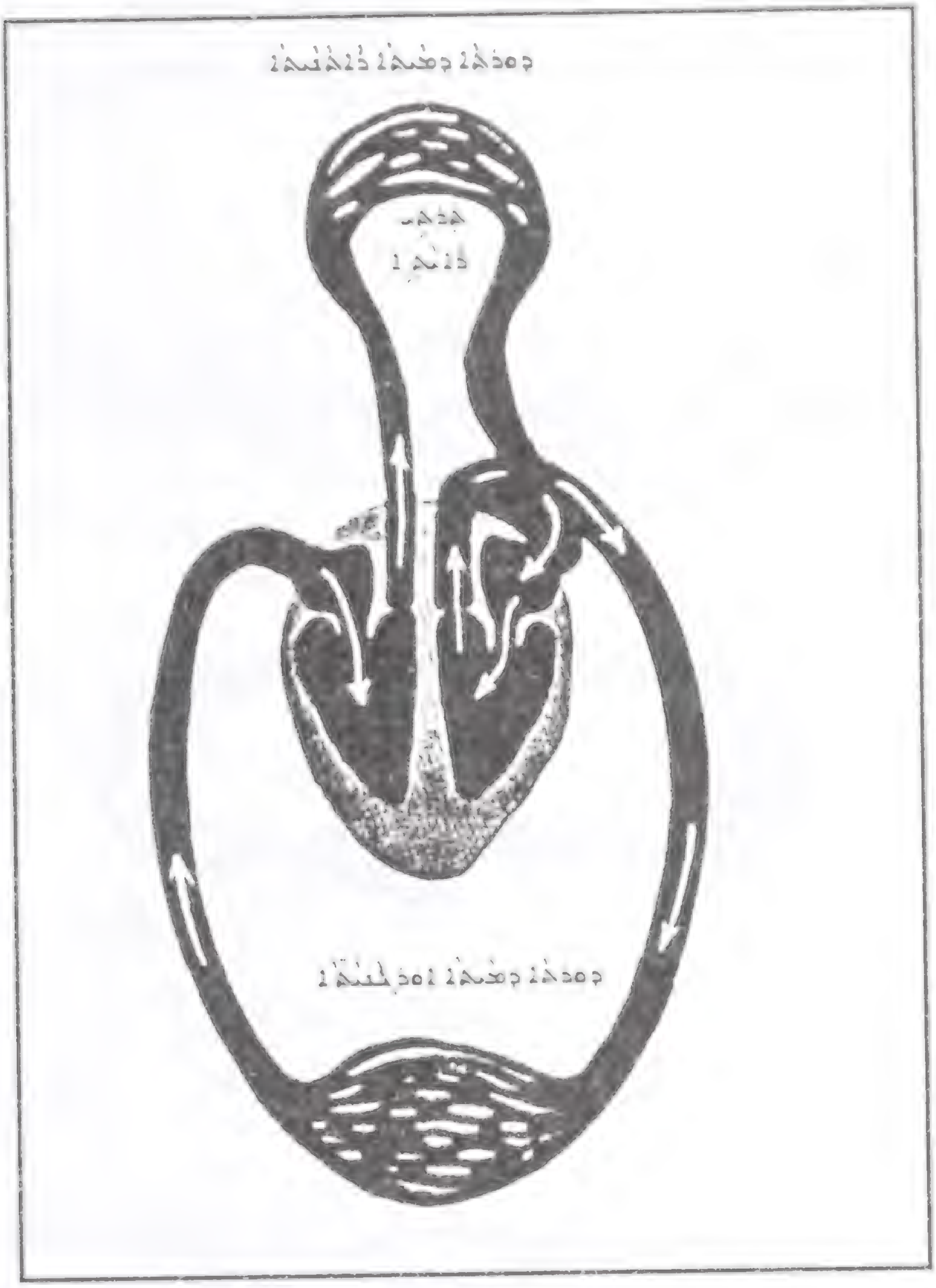


ܨܘܪܬܐ (٢ - ١١) ܨܘܪܬܐ ܡܚܘܝܢܝܬܐ ܠܕܘܪܐ ܕܕܡܐ ܚܕܢܝܐ

ܒ . ܕܘܪܐ ܕܕܡܐ ܬܪܝܢܝܐ ܝܢ ܥܦܝܦܐ (Double blood circulation) ܗܝ ܕܐܝܬ ܠܗ ܢܘܢܐ ܐܠܗܝܢ ܘܦܬܟܪܬܐ ܐܚܪܢܝܬܐ . ܘܡܫܘܫ ܠܠܒܐ ܕܕܡܐ ܘܐܒܝܫܐ ܠܟܘܢܐ ܡܢ ܓܘܫܡܐ ܕܒܝܬܐ . ܚܕ ܠܓܒܐ ܝܡܝܢܐ ܡܢ ܠܒܐ . ܟܕ ܗܢܐ ܗܘܐ ܦܝܫ ܡܫܕܪܐ ܠܟܘܠܗܘܢ ܐܠܗܝܢ . ܕܟܕ ܗܘܣܠܦܐ ܕܗܘܦܐ . ܘܟܕ ܕܡܐ ܐܘܟܡܐ ܠܓܒܐ ܣܡܠܐ ܡܢ ܠܒܐ ، ܗܘ ܕܡܫܕܪܐ ܠܝܬܗ ܠܪܝܬܐ ܕܒܝܬܐ . ܘܦܝܫܐ ܡܠܗ ܢܓܝܕܐ ܕܕܘܪܐ ܕܕܡܐ ܗܝ ܕܡܬܕܪܐ ܡܢ ܓܒܐ ܝܡܝܢܐ

ܕܠܒܐ ، ܘܠܗܕܡ̈ܐ ܐܚܪ̈ܢܐ . ܕܡܫܠܡܢܐ ܕܡܐ ܢܩܝܐ ܡܢ ܠܒܐ ، ܒܡܪܕܘܬܐ ܪܘܪܒܬܐ (ܠܡܪܕܘܬܐ) (ܨܘܪܬܐ (٢ - ١٢) .

ܘܡܢ ܕܪܕܚܝ ܠܐܘܪܒܬܐ ܕܡܫܢܐ ܠܗ ܬܕܪܬܐ ܚܕ ܠܘܦܬܐ ܥܠ ܕܘܪܕܐ ܕܕܡܐ ܙܘܪܘܪܒܬܐ .



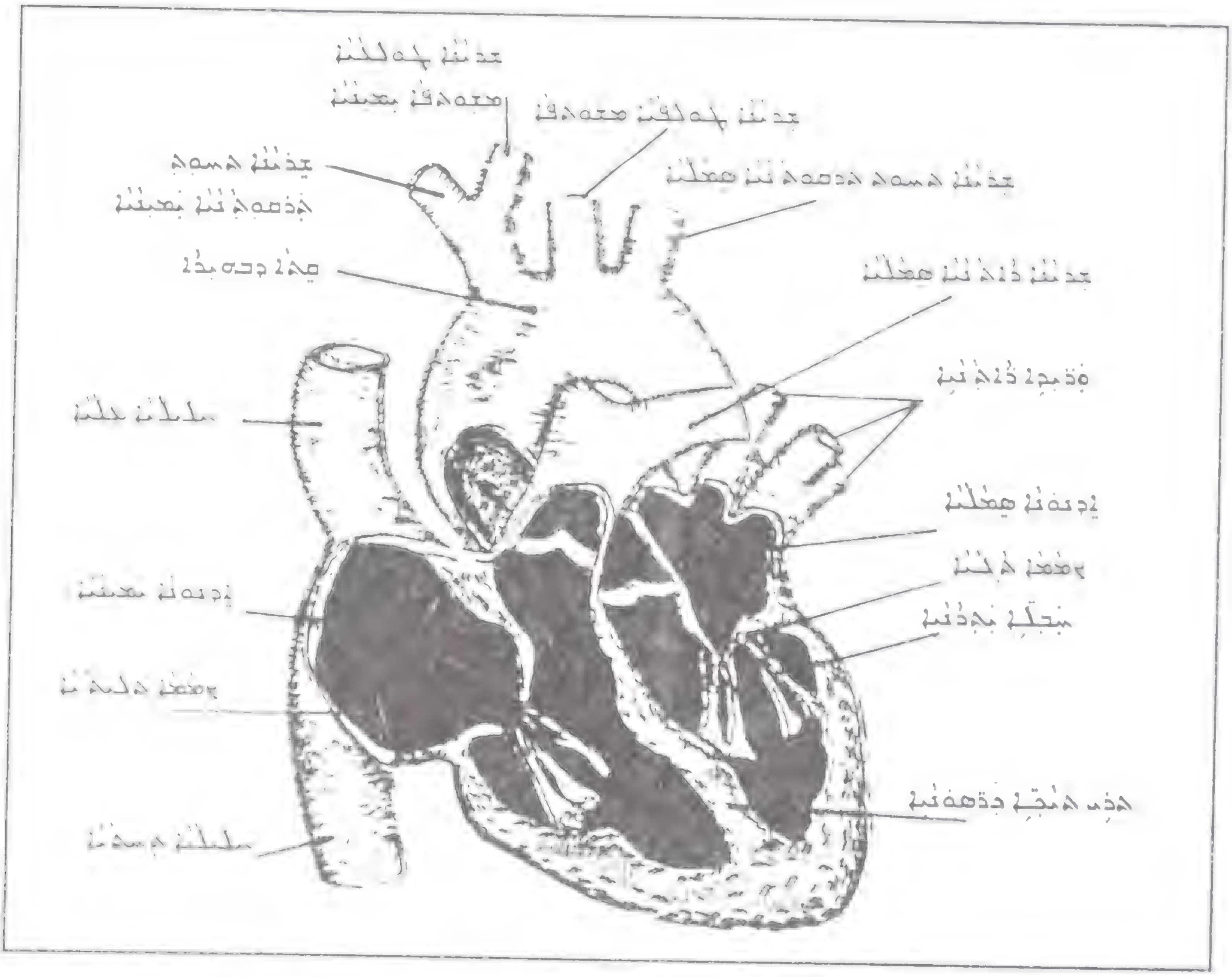
ܨܘܪܬܐ (٢ - ١٢) ܨܘܪܬܐ ܡܣܒܪܢܝܬܐ ܠܡܪܕܘܬܐ ܕܕܡܐ ܙܘܪܘܪܒܬܐ

٥ - ١ - ١ - ܠܒܐ Heart :

ܝܠܗ ܚܕ ܗܕܡܐ ܕܘܡܒܪܫܢܐ ܚܝܠܢܐ، ܕܐܝܬ ܠܗ ܚܝܠܬܢܘܬܐ ܡܫܘܕܥܬܐ. ܒܝܕ ܗܕܐ ܕܐܢܝܬܐ ܠܗ ܡܦܩܐ ܙܘܕܢܐ. ܐܝܬ ܠܗ ܐܪܒܥܐ ܒܝܬܘܢܐ. ܐܬܪܗ ܠܒܝܬ ܘܡܕܘܪܗ ܠܓܘܗ. ܘܟܠܝܐ ܡܢܘܪܗ ܐܘܐ ܡܢ ܡܕܥܬܐ ܡܝܘܬܢܐ ܕܙܕܩܐ. ܠܒܝܬ ܚܡܠܐ ܕܓܒ ܝܡܝܢܐ ܘܣܡܠܝܐ.

ܦܝܫ ܦܠܓܐ ܠܒܐ ܒܚܕ ܫܘܪܐ ܠܬܪܝ ܦܠܓܐ، ܝܡܝܢܝܐ ܘܣܡܠܝܐ. ܘܦܠܓܐ ܟܠ ܦܘܫ ܠܬܪܝ ܦܘܪܫܝܬܐ. ܦܠܓܐ ܦܪܘܫܬܐ ܠܗ ܡܫܡܗܐ ܐܕܘܢܬܐ. ܘܦܪܫܬܐ ܡܫܡܗܬܐ ܟܕܗܘܢܐ. ܐܢܐ ܦܪܫܐ ܠܗ ܡܫܡܗܐ ܦܢܝܬܐ. ܒܦܢܝܬܐ ܐܕܘܢܬܐ ܟܕܗܘܢܐ. ܘܙܘܕܐ ܒܫܘܫ ܕܠܒܐ ܡܬܘܕܥܐ ܠܗ ܡܢ ܬܪܬܝ ܦܘܪܫܝܬܐ. ܦܠܓܐ ܐܕܘܢܬܐ ܘܦܠܓܐ ܟܕܗܘܢܐ.

ܡܫܠܠ ܟܠ ܐܕܘܢܬܐ ܒܟܕܗܘܢܐ ܒܫܒܠܐ ܦܬܚܐ. ܒܐܘܪܚܐ ܕܦܬܚܐ ܐܕܘܢܬܐ ܟܕܗܘܢܐ. ܗܝ ܕܡܬܛܪܦܐ ܝܬܝܪܐ. ܡܢ ܟܘܡܟܪܬܐ ܕܕܡܐ ܡܢ ܐܕܘܢܬܐ ܠܟܕܗܘܢܐ، ܘܡܫܠܠ ܠܡܬܪܗ ܒܝܬܐ ܕܠܒܐ (ܨܘܪܬܐ (٢ - ١٣) .



ܨܘܪܬܐ (٢ - ١٣) ܡܬܘܪܬܐ ܠܠܒܐ ܘܡܢܘܬܐ ܡܫܠܢܐ ܒܗ ܘܐܪܒܥ ܦܘܪܫܝܘܗܝ

ܦܬܐ ܝܠܗ ܡܒܝܢܝܐ ܙܥܘܪܐ ܦܪܘܫܐ ܒܝܢ ܐܪܒܘܬܐ ܝܡܝܢܝܬܐ ܘܐܪܥܘܬܐ ܝܡܝܢܝܬܐ ܕܙܥܘܪܐ ܗܘܝܐ ܬܠܬܐ ܛܪܦܐ ، ܐܝܟܐ ܕܒܝܢܝܐ ܝܠܗ ܙܥܘܪܐ ܦܪܘܫܐ ܒܝܢ ܐܪܒܘܬܐ ܣܡܠܝܬܐ ܘܐܪܥܘܬܐ ܣܡܠܝܬܐ ܕܙܥܘܪܐ ܗܘܝܐ ܬܪܝܢ ܛܪܦܐ ، ܐܘ ܙܥܘܪܐ ܗܕܡܝܐ . ܡܛܠ ܒܡܥܪܩܬܐ ܚܕܪܐ ܠܙܥܘܪܐ ، ܬܪܝܢ ܘܒܥܕܐ ܝܠܗ ܚܝܠܐ ܬܪܝܢܐ (ܦܠܚܝ ܠܡܦܠܚܬܐ ܕܡܠܟܬܐ ܕܙܥܘܪܐ ܠܟܠܗ ܐܪܒܘܬܐ (Chordae tendinae) ܒܐܪܒܥܐ ܕܡܢܝܬܐ ܕܐܪܥܘܬܐ . ܡܛܠ ܡܬܠܝܐ ܡܢ ܠܒܟܐ ܐܣܪܬܐ ܒܥܘܡܕܢܝܬܐ ܚܠܡܬܢܝܬܐ (Pipillary muscles) ܕܐܝܬ ܚܕܐ ܠܥܘܕܐ ܠܗܘܝܐ ܕܐܪܥܘܬܐ . ܐܦ ܐܝܬ ܗܕܝ ܙܥܘܪܐ ܥܠ ܚܕ ܡܢܝܗ ܦܠܓܗ ܗܘܕܐ (Semilunar) ܠܝܬ ܡܬܘܒܠܐ ܕܥܕܢܝܐ ܕܐܬܝܐ ، ܘܥܕܢܝܐ ܒܘܝܕܐ ، ܦܬܚܝ ܠܝܬ ܡܢܘܬܐ ܕܐܪܥܘܬܐ ، ܘܡܟܒܪ ܕܡܐ ܠܗܕܝ ܥܕܢܝܐ ܡܘܕܝܕܐ ، ܟܕ ܗܘܐ ܕܥܕܝ ܠܝܬ ܦܬܚܬܐ ܕܗܕܝ ܐܪܥܘܬܐ ، ܕܡܬܠܝ ܠܥܪܩܬܐ ܕܕܡܐ ܐܠܝܗ .

ܡܬܘܪܟܐ ܝܠܗ ܠܒܐ ܕܠܒܐ ܡܢ ܗܠܬܐ ܥܪܒܬܐ ، ܝܠܗ ܡܥܕܝܬܐ ܡܢ ܠܒܝܐ :

ܐ ـ ܡܪܡܝܠܬܐ (Endocardium) :

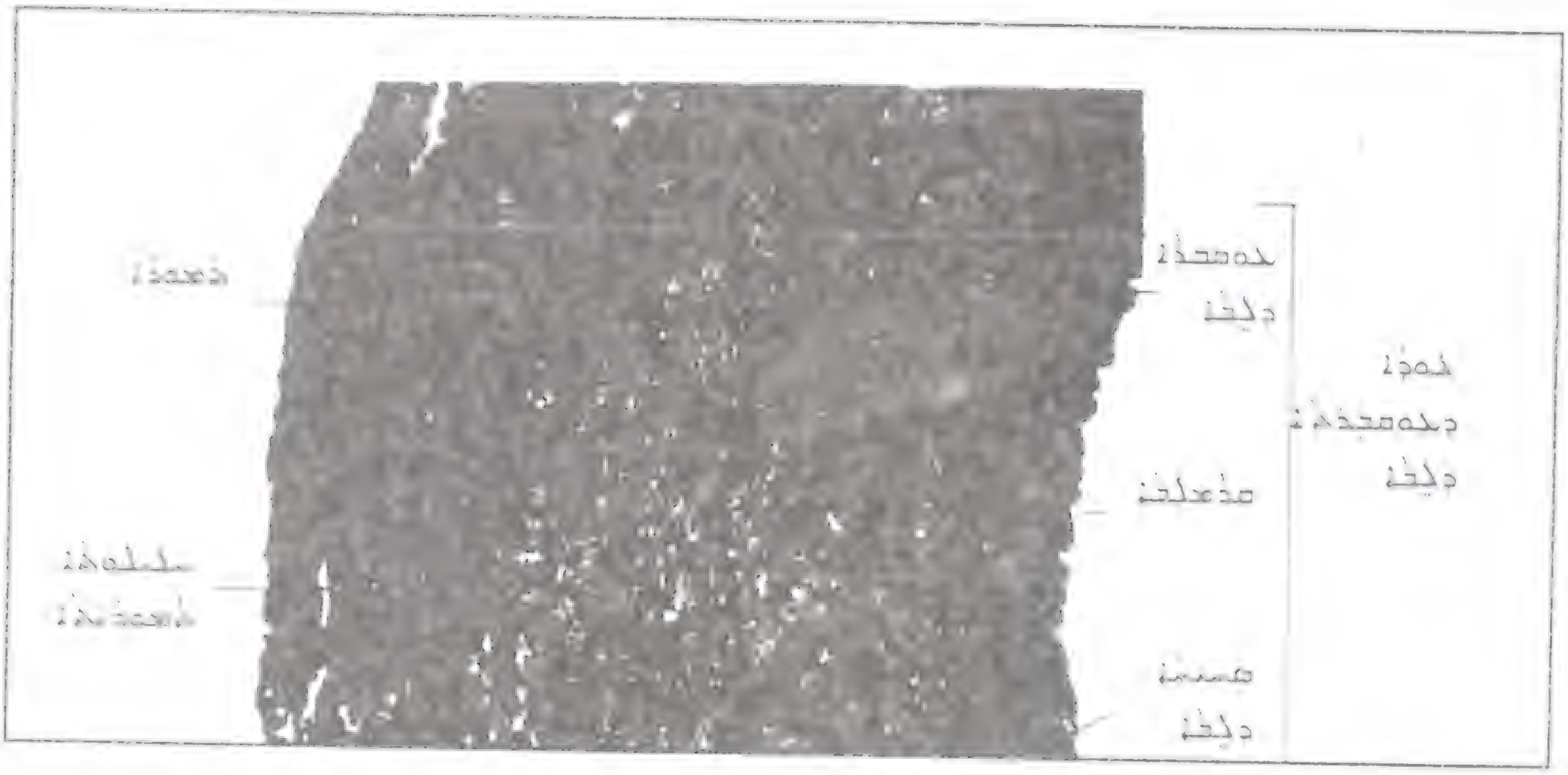
ܡܬܘܪܟܐ ܝܠܗ ܡܪܡܝܠܬܐ ܡܢ ܚܕ ܘܣܘܪܐ ܡܪܡܢܐ ܥܠܘܬܢܐ ܦܬܝܚܐ . ܘܚܕܐ ܥܪܒܬܐ ܡܢ ܘܣܘܪܐ ܐܣܘܪܐ .

ܒ ـ ܒܘܣܡܪܐ ܕܠܒܐ (Myocardium) :

ܡܬܘܪܟܐ ܝܠܗ ܡܢ ܪܒܠܐ ܠܒܝܐ . ܦܪܝܫܐ ܝܠܗ ܕܐܝܬ ܝܠܗ ܡܬܦܪܫܐ ܠܐ ܙܒܢܝܐ ، ܡܬܘܪܟܐ ܡܢ ܒܘܪܬܐ ܠܣܘܪܢܝܬܐ . ܦܪܝܫ ܡܢ ܚܕܪܐ ܒܐܣܦܪܐ ܒܢܬܢܝܬܐ ، ܘܐܝܬܠܗܘܢ ܚܕ ܠܪܘܡܐ ܡܬܠܪܘܬܐ ، ܘܗܘܝ ܐܝܬ ܪܒܠܐ ܡܬܦܪܟܝܐ ܘܡܟܪܘܠܐ (ܠܒܠܝܐ) . ܘܒܠܝܐ ܝܠܗ ܚܕܡܐ ܡܢܝܗ ܒܡܬܠܝܬܐ ܕܡܥܒܕܘܬܐ ܕܘܪܟܝܬܐ ، ܘܗܠܝܗ ܦܪܝܫ ܡܒܝܢܐ ܒܪܒܠܐ ܕܦܘܪܟܢܓܝ (Purkinje fibres) . ܘܗܘܢܐ ܐܘܐ ܥܪܒܬܐ ܒܝܢ ܚܠܡܬܐ ܠܗ ܥܪܩܬܐ ܡܢܗ ܕܠܗ ܐܪܒܘܬܐ .

ܓ ـ ܦܫܝܛܐ ܕܠܒܐ (Epicardium) :

ܘܡܬܘܪܟܐ ܝܠܗ ܡܢ ܚܕܐ ܥܪܒܬܐ ܪܦܝܬܐ ܡܢ ܘܣܘܪܐ ܐܣܘܪܐ . ܘܘܣܘܪܐ ܡܪܡܢܐ ܥܠܘܬܢܐ ܦܬܝܚܐ . ܐܚܙܝ (٢ ـ ١٤) .



ܨܘܪܬܐ (٢ ـ ١٤) ܡܚܘܝܢܐ ܠܗ ܓܘܫܐ ܕܟܘܡܪܬܐ ܕܠܒܐ .

ܗ — ١ — ٢ ـ ܥܪ̈ܩܐ ܘܘܪ̈ܝܕܐ (Arteriesand Veins) :

ܗܘܝ ܥܪ̈ܩܐ (Arteries) ܘܘܪ̈ܝܕܐ (Veins) ܡܢܬ̈ܐ ܕܠܒܐ . ܐܝܟ ܡܢ̈ܝܢܐ ܝܬܝܪ ܠܓܘܫܐ ܕܐܘܪܓܢ̈ܐ ܕܦܓܪܐ . ܘܝܬ ܫܠܝܛܐ ܒܓܘܪܢܝܗ . ܘܠܘܬܐ ܕܪܫܘܠܝܢ ܡܢ ܠܒܐ . ܒܫܘܡ ܕܥܪ̈ܩܐ ܘܘܪ̈ܝܕܐ . ܘܠܝܗ ܗܘܬܐ ܕܪܚܫܝܢ ܠܓܒܝܢܐ ܕܐܣܪܐ . ܒܕܪ ܡܬܪܝܗ ܘܒܬܪ ܫܠܝܡܘܬܐ ܕܓܘܪܢܝܗ . ܥܠ ܐܝܟܢ ܕܡܬܬܐܠܡ ܠܡܥܒܕܢܘܬܐ ܕܦܓܪܐ . ܒܫܘܡ ܫܘܟܠܐ ܡܢܝܗ ܒܐܫܟܝܢ ܒܟܪ̈ܝܐ ܕܟܒܪܬܐ ܕܐܣܛܪܘܢܐ ܡܬܘܚܕܐ ܠܗܘܢ . ܡܬܗܘܝܐ ܡܢܗ ܠܘܦܐ ܕܡܬܬܘܚܕܬܐ ܕܦܓܪܐ ܡܢ ܟܪܟܐ ܒܪܬܐ ܐܘ ܟܠܗ . ܘܫܘܟܠܐ ܠܗܘܬܐ ܡܢ ܚܕܐ ܒܕܪܬܐ ܟܘܡܪܬܐ . ܐܣܛܪܘܬܐ ܦܫܝܛܬܐ ܕܡܬܗܘܝܐ ܡܬܬܘܚܕܬܐ ܘܠܘܬܐ ܗܘܢ ܠܟܪ ܐܘ ܐܣܛܪܘܬܐ ܚܕܐ ܟܪܡܬܐ ܕܩܝܡܬܐ ܡܢ ܫܘܪܐ ܐܣܦܪܐ . ܡܬܗܘܝܐ ܡܢܐ ܠܗܘܢ ܕܥܪ̈ܩܐ ܘܘܪ̈ܝܕܐ ܒܬܘܪܬܐ ܠܗܢܬܐ ܡܢ ܟܠܗ ܟܪܡܬܐ ، ܒܠܝܗ

١ ـ ܬܠܬܐ ܠܘܚܐ (Tunica Intima) :

ܡܬܗܘܝܐ ܠܗ ܡܢ ܐܣܛܪܬܐ (Endothdlum) ܗܘܢܐ ܡܢ ܫܘܪܐ ܡܪܟܢܐ ܟܘܡܪܬܐ ܦܫܝܛܬܐ . ܡܚܘܝ ܠܗ ܡܢܝܢܐ ܡܢܬܝܢ ܒܠܒܐ ܟܕ ܡܪܟܢܐ ، ܘܡܢ ܫܘܪܐ ܐܣܦܪܐ ܕܟܠܗ ܡܢܬܐ .

٢ - ܬܠܐ ܡܨܥܝܬܐ (Tunica Media) :

ܡܬܒܢܝܐ ܗܝ ܡܢ ܩܛܝܢܐ ܕܡܫܪܝܬܐ ܚܠܝܠܬܐ ، ܘܩܛܝܢܐ ܡܬܬܚܝܢܐ ܡܬܬܢܚܝ ܣܘܪܕܢܝܬܐ . ܘܦܪܫܐ ܦܫܝܛܘܬܐ ܕܗܕܐ ܫܘܝܐ ܕܩܛܝܢܐ ܘܚܝܠܘܬܐ ܕܥܪܩܘܬܐ ، ܠܗ ܥܠܬܐ ܡܫܚܠܦܐ .

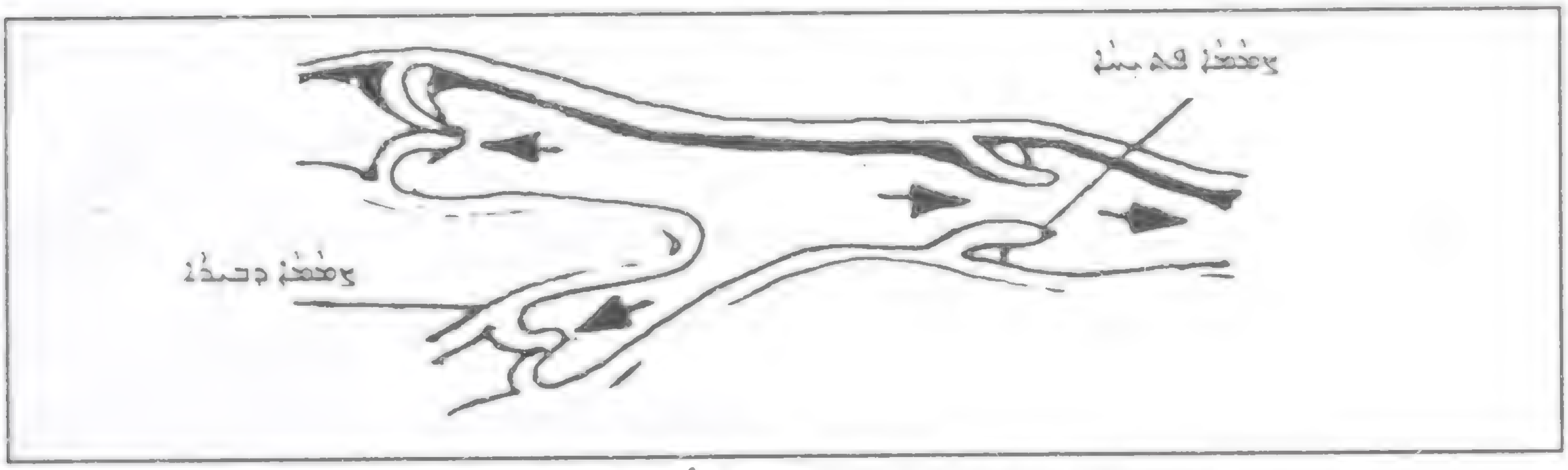
٣ - ܬܠܐ ܒܪܝܐ (Tunica Adventitia) :

ܡܬܒܢܝܐ ܗܝ ܡܢ ܗܕܡܐ ܐܣܘܪܐ . ܒܠܥܕ ܚܝܕ ܥܠܬܐ ܕܡܠܝܐ ܠܥܪܩܐ . ܡܬܪܚܩ ܠܥܪܩܐ ܕܥܠܬܐ ܠܓܘܪܐ .

ܦܪܝܫܢ ܗܢܐ ܘܪܝܕܐ ܡܢ ܥܪܩܐ ܒܬܘܡܗܐ ܡܢܗܘܢ :

١ - ܗܘܝ ܘܪܝܕܐ ܒܝܕ ܐܘܡܢܐ ܒܥܪܩܐ ܡܬܬܪܕܝܬܐ ، ܘܒܝܕ ܠܓܘܪܐ ܒܡܬܥܪܐ ܡܢ ܥܪܩܐ ܒܪܘܓܠܐ .

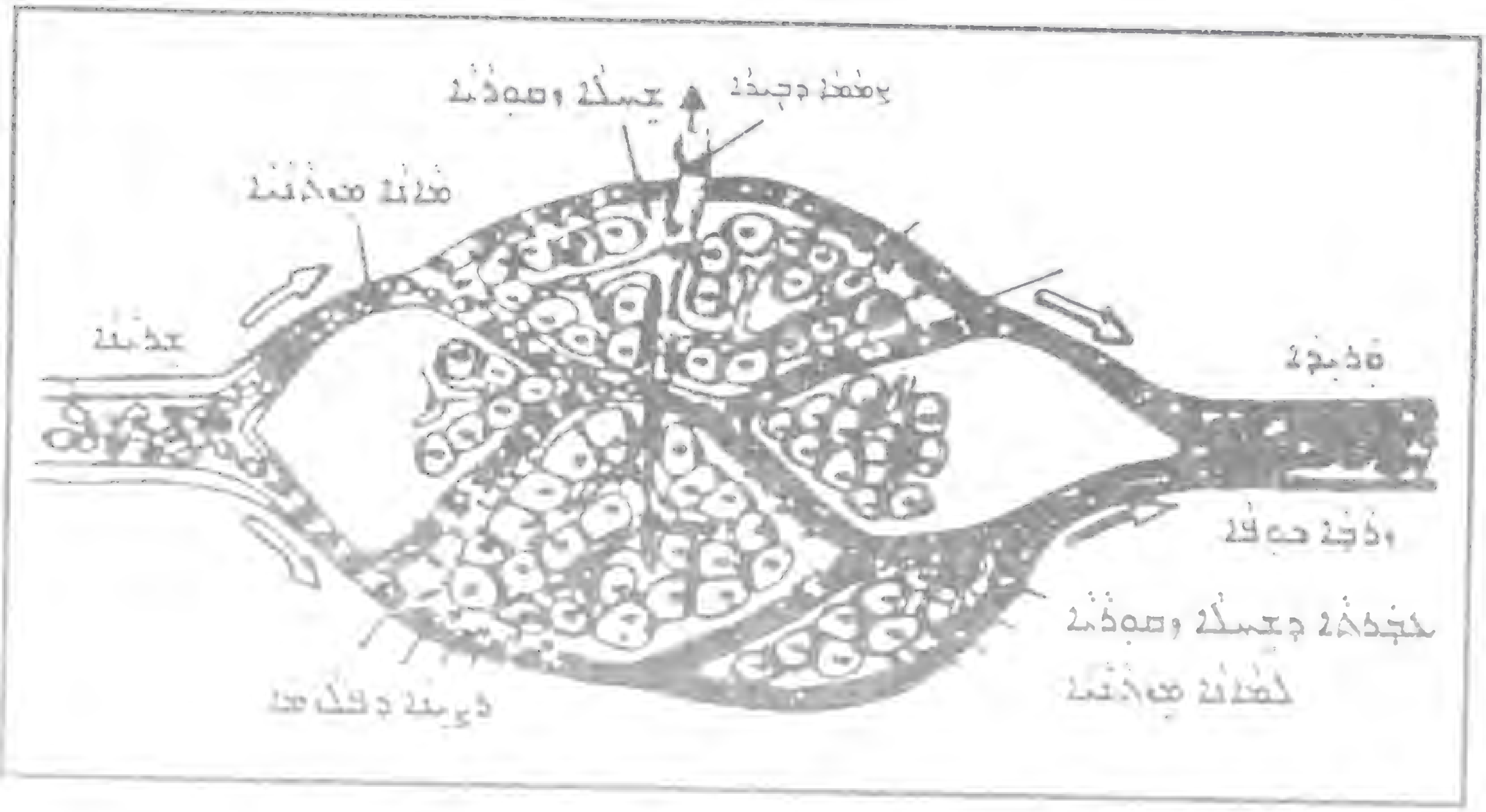
٢ - ܡܫܝܢ ܠܗ ܚܠܝܠܘܬܐ ܕܘܪܝܕܐ ܥܪܩܐ ، ܡܫܠܚ ܠܓܠܕܬܐ ܕܕܡܐ ܕܫܡܝܢܐ ܡܢ ܠܒܐ ، ܘܐܝܬ ܥܪܩܐ ܒܠܚܘܕ ܒܦܢܝܬܐ ܘܠܒܢܝܬܐ ܡܢ ܬܠܐ ܠܗܘܢ . ܨܘܪܬܐ (٢ - ١٥) .



ܨܘܪܬܐ (٢ - ١٥) ܦܘܠܚܢܐ ܕܥܪܩܐ ܘܘܪܝܕܐ

٥ — ١ — ٣ - ܡܘܨܦܢܝܬܐ ܕܕܡܐ :

ܡܫܬܠܚ ܒܝܢ ܥܪܩܘܬܐ ܡܢ ܚܕ ܠܒܢܬܐ ، ܘܘܪܝܕܐ ܡܢ ܠܒܢܬܐ ܐܚܪܢܐ ، ܒܠܚܘܕ ܥܠܬܐ ܕܡܢܝܢܐ ܦܫܝܛܐ ܗܢܐ ܒܕܝܠܝܐ ܒܡܘܨܦܢܝܬܐ ܕܕܡܐ (Blood Capillaries) . ܕܡܬܒܢܝܐ ܗܢܐ ܠܥܪܩܐ ܡܘܨܦܢܝܬܐ ܡܢ ܐܫܬܐܕܐ ܡܕܡܝܐ ، ܘܡܫܬܘܕܥ ܒܫܒܝܠ ܚܕܟܡܐ ܠܗܘܬܐ ܚܕܐ ܒܪܘܫܬܐ ܕܡܢܝܬܐ ܡܢ ܗܕܡܐ ܐܣܘܪܐ . ܒܪ ܕܐܝܬܐ ܣܘܥܪܢܐ ܗܢܐ ܕܘܟܐ ܕܪܒܐ ܠܗܘܫܠܦܐ ܕܡܠܘܐܐ ، ܒܝܢ ܕܡܐ ܘܗܘܕܐ ܕܠܘܥܡܐ . ܨܘܪܬܐ (٢ - ١٦)



ܨܘܪܬܐ (١٦ ـ ٢) [illegible]

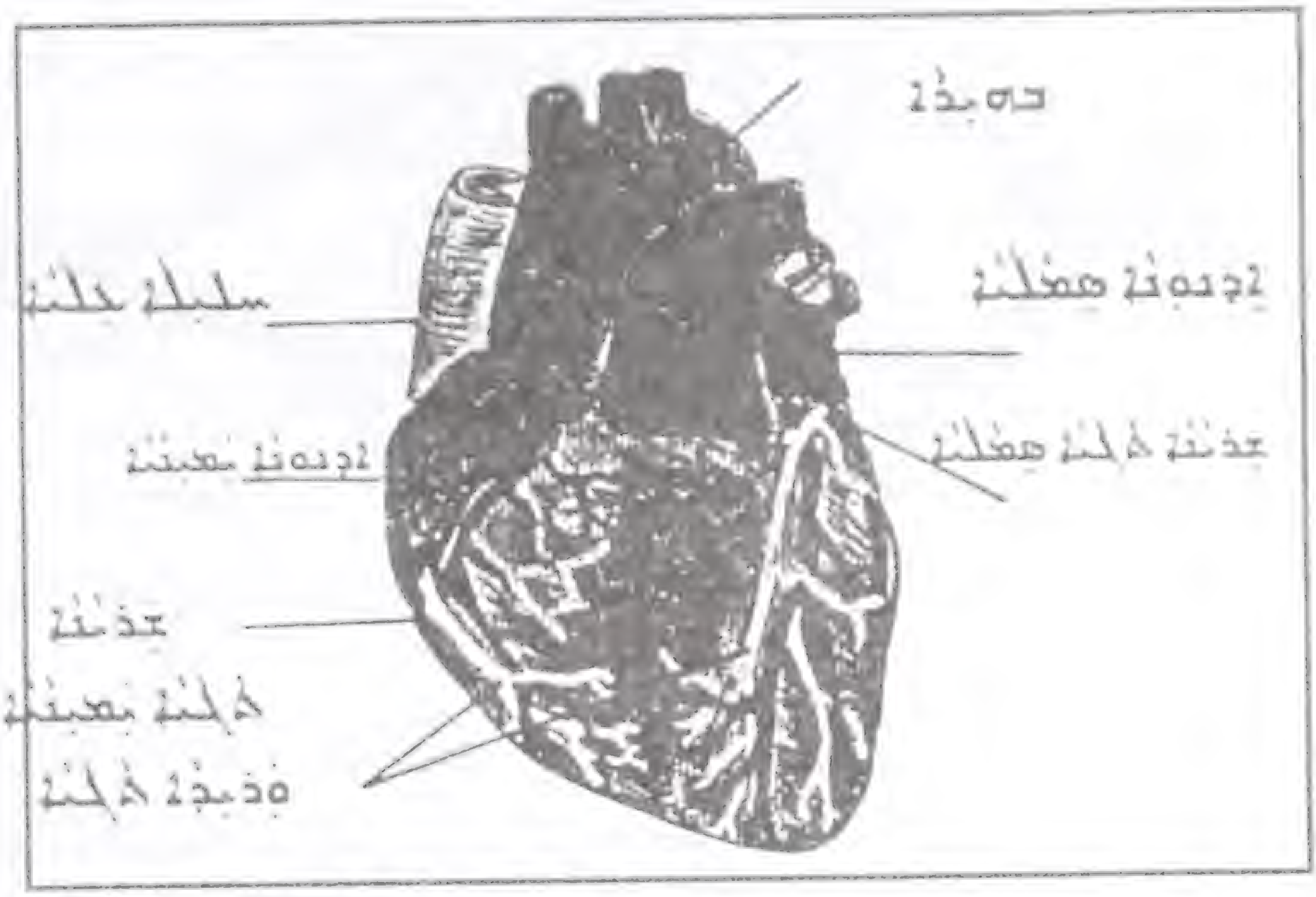
٥ — ١ — ٤ ـ ܦܘܠܚܢܐ ܕܓܡܘܪܬܐ ܕܠܝܡܦܐ :

[illegible]

٥ — ١ — ٥ ـ ܦܘܠܚܢܐ ܕܓܡܘܪܬܐ ܐܦ ܛܚܠܐ :

[illegible]

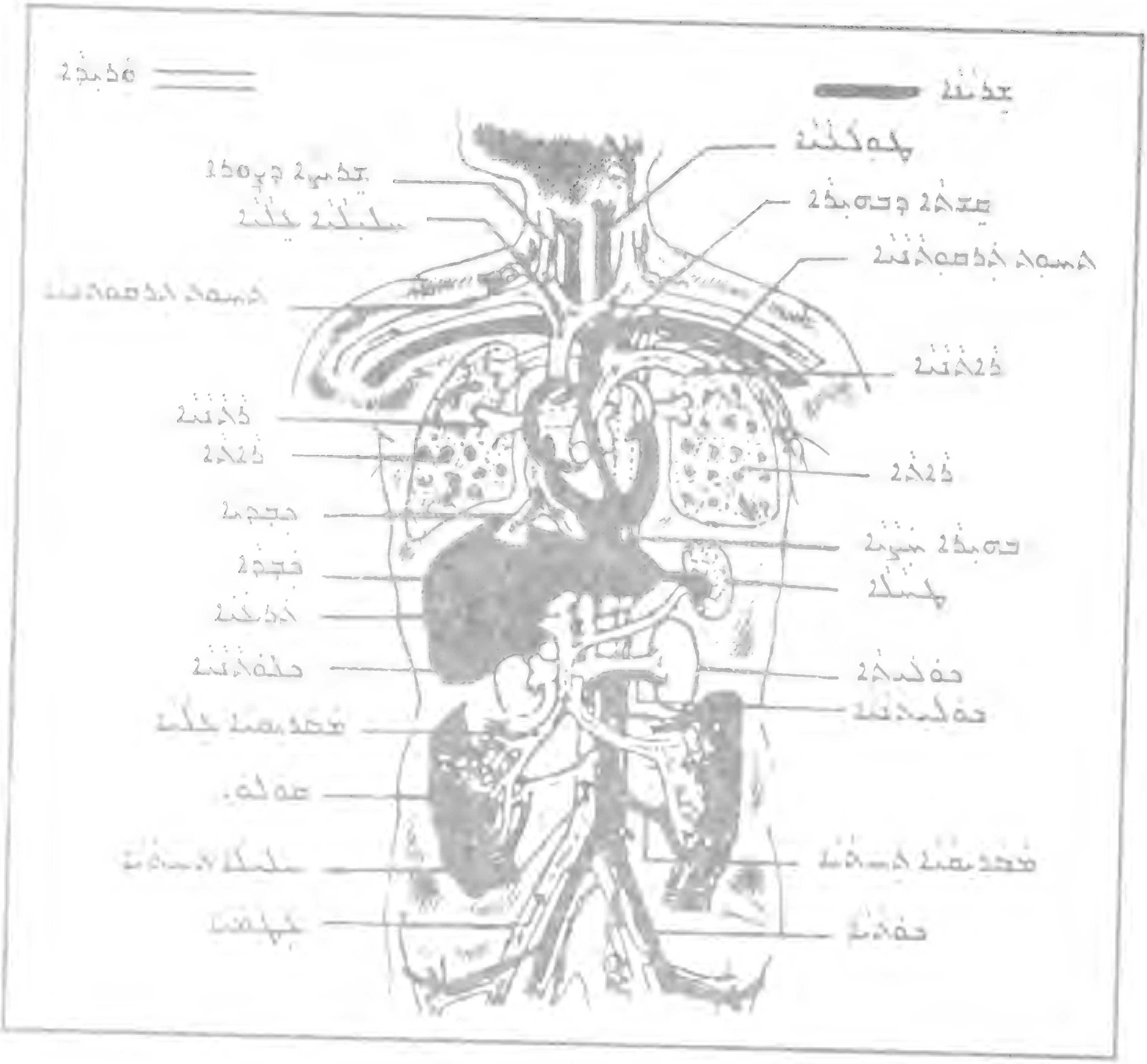
ܒܘܪܐ ܐܠܘܛܐ. ܗܕܐ ܥܪܩܐ ܪܒܐ، ܡܫܕܪ ܠܕܡܐ ܠܟܠܗ (ܨܘܪܬܐ ٢ - ١٧).



ܨܘܪܬܐ (٢ - ١٧) ܚܙܘܐ ܒܪܝܐ ܠܠܒܐ ܕܒܪܢܫܐ

ܘܡܢ ܒܘܪܐ ܐܠܘܛܐ ܦܠܓ ܣܡܠܐ. ܘܡܢܗܘܢܐ ܐܝܬܘ ܡܘܫܐ ܒܦܘܫܐ ܡܢܗ ܒܡܬܐ ܕܒܘܪܐ. ܟܕ ܗܘܐ ܠܡܫܬܐ. ܕܦܠܓ ܒܬܪܐ ܒܒܘܪܐ ܢܣܩܐ. ܘܒܥܪܩܐ ܕܡܬܦܠܓܝܢ ܡܢܗ ܡܬܐ ܒܘܪܬܐ ܗܠܝܢ ܥܪܩܐ. ܐܝܬ ܥܪܩܐ ܠܐ ܡܬܘܡܝܐ. ܘܥܪܩܐ ܡܬܦܠܓܝܢ ܡܢܗܘܢ ܣܡܠܐ. ܘܥܪܩܐ ܗܢܘܢ ܪܥܘܬܐ ܣܡܠܝܬܐ.

ܗܦܟܝܢ ܥܪܩܐ ܠܐ ܡܬܘܡܝܐ ܠܥܪܩܐ ܗܢܘܢ ܪܥܘܬܐ ܝܡܝܢܝܐ. ܘܠܥܪܩܐ ܡܬܦܠܓܝܢ ܡܢܗܘܢ ܝܡܝܢܐ. ܡܛܠ ܥܪܩܐ ܡܬܦܠܓܝܢ ܡܢܗܘܢ ܝܡܝܢܐ. ܘܡܬܦܠܓܝܢ ܡܢܗܘܢ ܣܡܠܐ ܠܟܠܗ. ܐܝܟܢܐ ܡܢܘܪ ܟܠ ܥܪܩܐ ܗܢܘܢ ܪܥܘܬܐ ܠܓܘܫܡܐ ܟܠܗ ܠܒܝܬܗ ܘܙܘܥܐ ܒܕܡܐ. ܗܘܟܢ ܒܘܪܐ ܢܣܩܐ ܠܗ ܙܒܢܐ ܥܪܩܐ ܘܠܒܐ. ܦܪܫ ܡܢ ܐܠܟܐ. ܦܪܫ ܗܢܐ ܕܦܠܓܐ ܒܥܪܩܐ ܡܢ ܐܠܟܐ. ܘܦܪܫ ܠܗ ܣܚܠܘܬܐ ܕܕܡܐ ܡܢ ܒܘܪܐ ܢܣܩܐ ܥܪܩܐ ܕܒܬܪܗ ܗܘܐ (ܨܘܪܬܐ ٢ - ١٨).



ܨܘܪܬܐ (٢ ـ ١٨) ܐܪܥܢܐ ܕܓܘܫܡܐ ܠܘܬ ܥܪ̈ܩܐ

١ ـ ܥܪ̈ܩܐ ܚܠܝܠܐ (Coeliacartery) : ܡܦܠܓ ܠܬܠܬܐ ܥܪ̈ܩܐ : ܝܗܒ ܟܒܕܐ ܘܡܥܕܬܐ ܘܛܚܠܐ .

٢ ـ ܡܩܕܡܬܐ ܥܠܝܬܐ (Superiovmesentevie) : ܡܣܘܦܩ ܡܥܝܐ ܕܩܛܝܢܐ . ܘܦܠܓܐ ܥܠܝܐ ܡܢ ܡܥܝܐ ܥܒܝܐ ܕܪܘܒܐ .

٣ ـ ܥܪ̈ܩܐ ܕܟܘ̈ܠܝܬܐ (Renall a .) : ܝܗܒ ܥܪ̈ܩܐ ܕܡܠܝܢ ܕܡܐ ܠܟܘ̈ܠܝܬܐ ܘܡܢ ܗܪܟܐ ܕܟܘ̈ܠܝܬܐ .

٤ ـ ܥܪ̈ܩܐ ܡܬܠܝܢܐ (Gonadal a .) : ܝܗܒ ܥܪ̈ܩܐ ܕܡܠܝܢ ܕܡܐ ܠܒܝܬܐ ܕܝܠܕܐ .

٥ ـ ܥܪ̈ܩܐ ܡܩܕܡܝܐ ܬܚܬܝܐ (Inferiormesentric a .) : ܡܣܦܩ ܕܡܐ ܠܦܠܓܐ ܬܚܬܝܐ ܡܢ ܡܥܝܐ ܥܒܝܐ ܘܦܘܩܕܐ .

٦ - ܒܬܪܝܢܐ ܡܫܠܛܢܐ ܡܬܪܥܝܢ ܠܐܘܪܚܐ ܕܒܪܬܐ .

ܐܦܪܫ ܒܗܝܕܐ ܢܣܘܒܐ ܐܣܘܡ ܫܠܝܚܘܬܐ ܒܪܥܝܬܐ ܠܬܪܝܢ ܒܪܝܢܐ ܕܠܐܗܝܢ ܡܬܘܐܡܝܢ . ܡܫܠܛܢܐ ܘܡܫܝܚܐ . ܢܬܒܪ ܟܠ ܚܕ ܡܢܗܘܢ ܠܟܬܒܐ ܡܕܒܪܢܐ ܡܢܗ

ܟܕ ܝܕܥܝܢܢ ܕܡܢܐ ܡܢ ܫܘܪܝܐ ܕܟܘܪܢܫܐ ܒܗܕܐ ܕܥܒܕܝ ܐܦܢ ܐܢܘ ، ܣܓܝܐܐ ܕܢܒܪܝܢ ܒܢܘܡܘܣ ، ܡܬܘܕܥܝܢ ܐܠܦܝܢ ܫܘܪܝܐ ، ܘܒܟܠܗܝܢ ܡܢ ܐܢܐ ܢܬܝܠܐ ܘܪܒܘܬܐ ܠܐܘܪܚܐ .

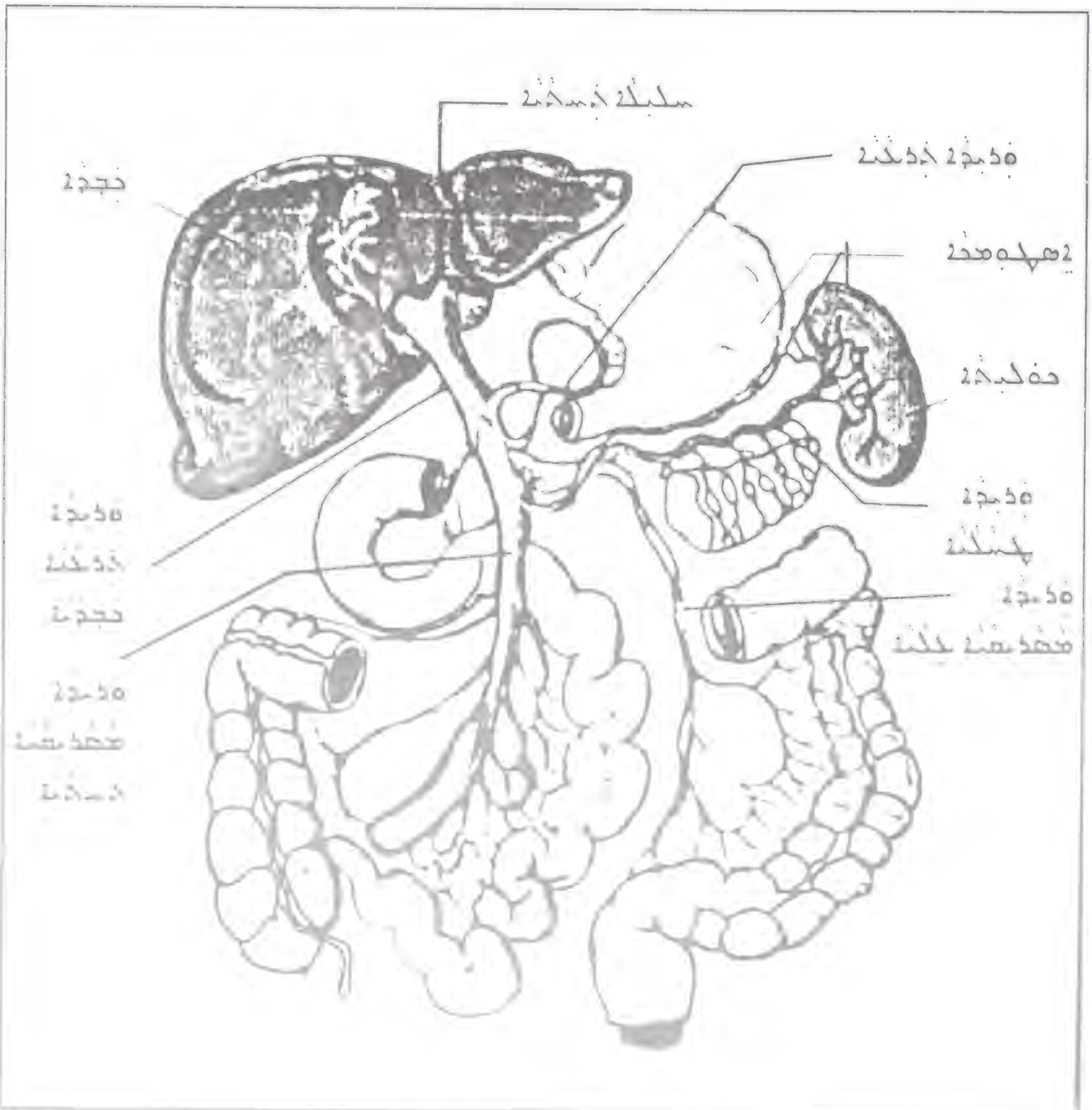
ܘܬܪܝܢ ܫܠܝܚܘܬܐ ܟܠܗܝܢ ، ܡܢ ܩܠܝܠܐ ܕܫܘܪܝܐ ܕܗܕܐ ܘܪܒܘܬܐ ܠܐ ܡܬܘܡܬܐ

ܘܐܦ ܬܪܝܢ ܫܠܝܚܘܬܐ ܡܫܝܚܝܐ ܠܟܪܝܐ ܡܢ ܫܘܪܝܐ ܡܫܝܚܝܐ ܕܟܘܪܢܫܐ ܠܐܘܢܝܐ ܢܫܝܐ . ܘܡܥܒܕܐ ܫܠܝܚܘܬܐ ܡܫܠܛܢܐ ܠܒܢܝ ܦܘܪܫܢܐ ܡܫܝܚܝܐ ܕܟܝܢܝܬܐ . ܒܕ ܟܕ ܡܬܘܕܥܐ ܡܢ ܡܩܝܡܘܬܐ ܕܗܕܐ ܘܪܒܘܬܐ ܕܠܐܗܝܢ ܡܬܘܐܡܝܢ . ܘܩܝܡܝܢ ܐܢܘܢ ܫܠܝܚܘܬܐ ܡܫܝܚܝܐ ܚܕ ܡܢܗܘܢ ܡܢ ܘܪܒܘܬܐ ܡܫܠܛܢܐ . ܘܗܕܐ ܘܪܒܘܬܐ ܒܟܠܗܝܢ ، ܘܪܒܘܬܐ ܒܒܪܝܬܐ .

٥ — ١ — ٦ - ܐܘܪܚܬܐ ܡܪܕܘܬܐ ܒܒܪܝܬܐ :

ܐܘܪܚܬܐ ܡܪܕܘܬܐ ܝܠܗ ܚܕ ܘܪܒܐ ، ܐܘ ܒܘܢܝܐ ܕܘܪܒܐ ، ܡܬܒܠܝ ܠܟܘܡܐ ܡܢ ܩܘܡܐ ܠܚܕ ܐܚܪܢܐ ، ܡܛܠ ܕܒܪܝܬܐ ܟܠܗܝܢ . ܘܐܘܪܚܬܐ ܡܪܕܘܬܐ ܒܒܪܝܬܐ ܠܐ ܝܠܗ ܐܘܪܚܬܐ ܡܪܕܘܬܐ ܠܣܘܦܐ ܐܠܐ ܠܟܘܡܐ ܕܒܪܝܬܐ . ܐܝܟܢܐ ܗܘ ܝܠܗ ܒܝܬ ܠܟܘܪܐ ܕܐܝܬ ܐܘܪܚܬܐ ܘܒܝܬ ܒܢܝܢܘܗܝ . ܘܚܘܝܫ ܐܠܐ ܕܗܘܐ ܐܘܪܚܬܐ . ܕܩܘܡܐ ܟܕ ܝܕܥܝܢܢ ܡܢ ܒܘܢܝܐ ܦܬܝܐ ܘܡܬܦܪܫ ܠܟܠܒܐ . ܘܠܐ ܠܫܠܝܚܘܬܐ ܡܫܝܚܝܐ . ܘܒܝܬܐ ܕܡܬܩܠܐ ܕܫܠܝܐ ܡܐܪܥܢܐ ܠܟܝܢܐ . ܐܠܐ ܒܘܢܝܐ ܦܬܝܐ ، ܒܡܬܚܫܒܢܘܬܐ ܕܒܒܪܝܬܐ ، ܡܛܠ ܕܟܬܒܝ ܠܐܘܪܚܬܐ ܐܝܬܝܗ ܕܣܘܦܐ .

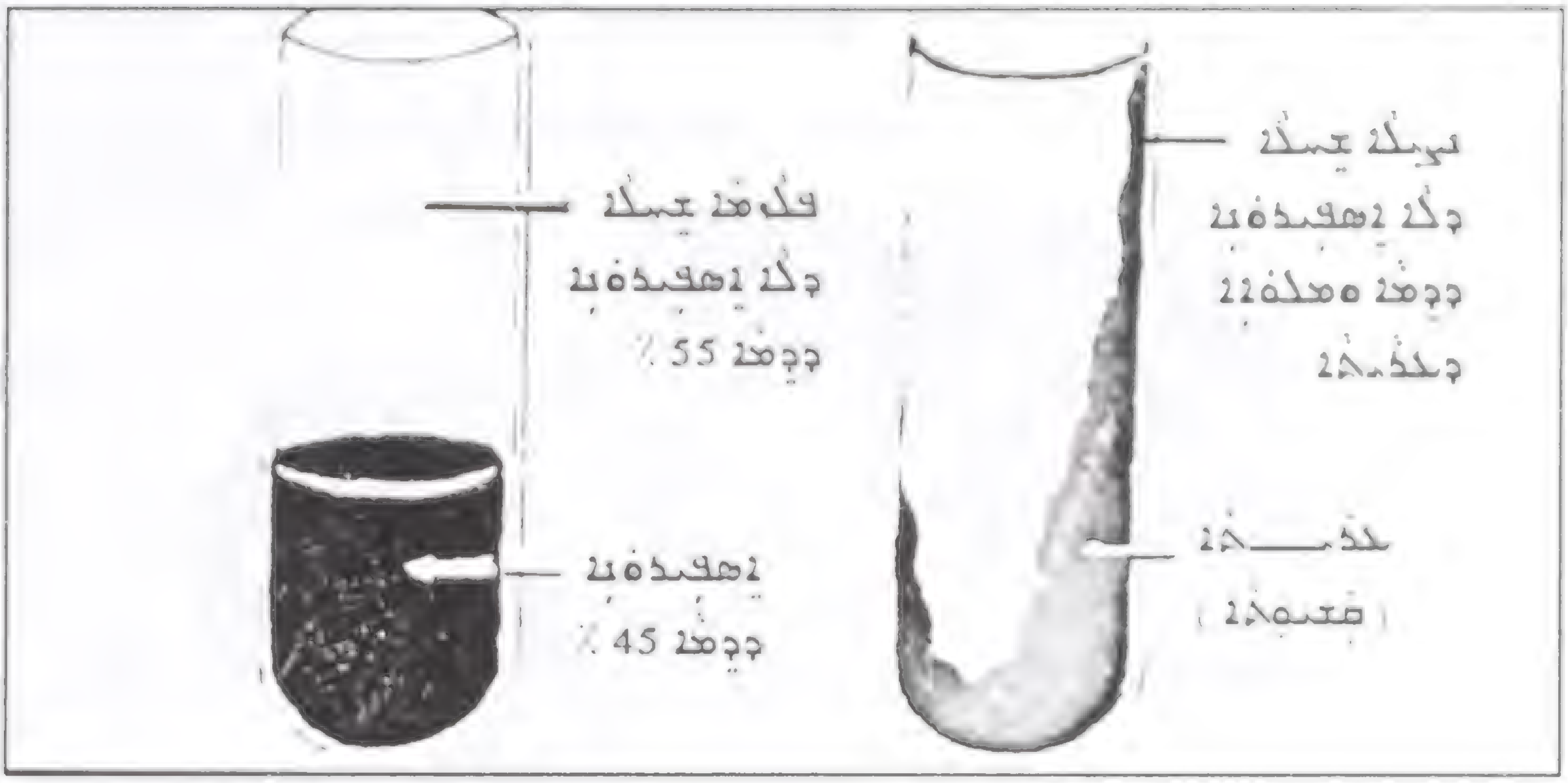
ܡܬܘܕܥܐ ܝܠܗ ܐܘܪܚܬܐ ܡܪܕܘܬܐ ܒܒܪܝܬܐ ܡܢ ܘܪܒܐ ܡܪܕܘܬܐ (ܡܢ ܦܬܝܘܬܐ ܡܪܕܘܬܐ ܕܐܣܦܘܪܡܐ) ، ܘܘܪܒܐ ܚܫܠܬܐ ، ܘܗܕܐ ܘܪܒܐ ܡܫܬܡܫܢܐ ܒܟܠܗ ܘܡܫܝܚܝܐ (ܐܣܛܘܡܐ ٢ — ١٩) .



ܨܘܪܬܐ (٢ - ١٩) ܘܪܝܕܐ ܬܪܥܢܝܐ ܟܒܕܢܝܐ

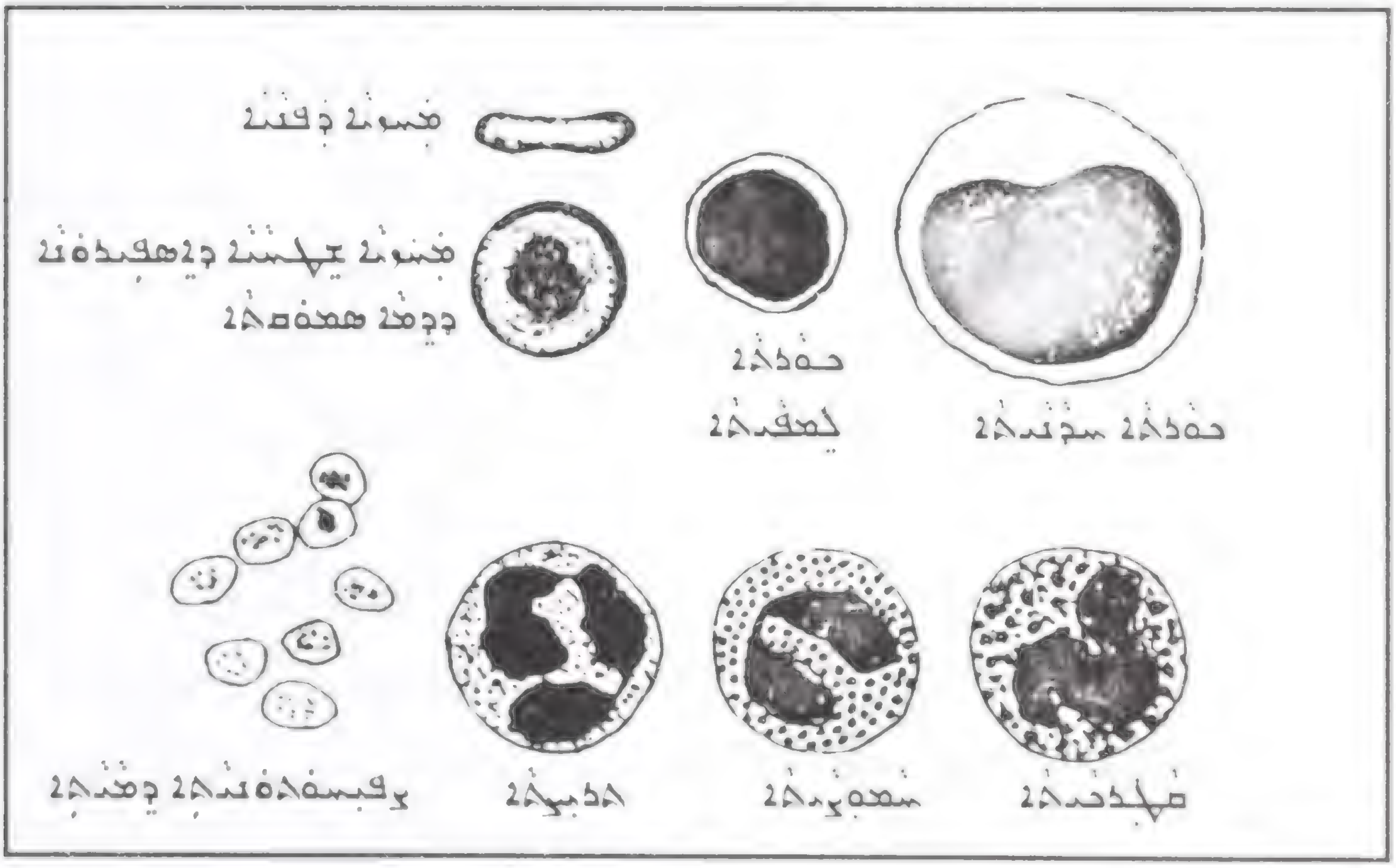
ܗ ـ ١ ـ ٧ ـ ܕܡܐ (Blood) :

ܒܓܘܫܡܐ ܝܠܗ ܝܣܠܐ ܕܟܕܐ ܠܗ ܡܥܪܟܬܐ ܕܡܐ . ܡܬܚܫܒ ܕܡܐ ܐܝܟ ٧ — ٩ % ܡܢ ܡܘܙܢܐ ܕܦܓܪܐ . ܘܫܒܝܚ ܡܘܙܢܐ ܐܘ ܚܫܝܒܘܬܐ ܕܕܡܐ . ܦܠܙܡܐ ܦܫܘܛܝܗ ٤٥% ܡܢ ܚܘܫܒܐ ܕܕܡܐ . ܐܝܟܢܐ ܦܫܝܛܘܬܐ ܦܠܙܡܐ ܘܝܠܗ ٥٥% ܗܘ ܝܠܗ ܝܣܠܐ ܕܓܒܠܐ ܒܦܠܓܘܬܐ ܕܕܡܐ (ܨܘܪܬܐ ٢ - ٢٠) .



ܨܘܪܬܐ (٢ ـ ٢٠) ܣܟܝܢܬܐ ܕܕܡܐ

ܦܪܫ ܡܫܘܕܥܝܢܢ ܟܘܪܬܐ ܕܕܡܐ ܠܐܣܦܝܪܘܬܐ ܕܕܡܐ ܣܘܡܩܬܐ (Erythrocytes) ܘܐܣܦܝܪܘܬܐ ܕܕܡܐ ܚܘܪܬܐ (Leucocytes) ܨܘܪܬܐ (٢ ـ ٢١)



ܨܘܪܬܐ (٢ ـ ٢١) ܙܢܝܐ ܕܟܘܪܬܐ ܕܡܢܝܬܐ ܕܕܡܐ .

٥ . ١ . ٨ ـ ܐܣܦܝܪ̈ܘܬܐ ܕܕܡܐ ܣܡܘܩܬܐ (Erythrocytes) :

ܗܠܝܢ ܐܣܦܝܪ̈ܐ ܫܡܘܦܠܘܬܐ ܡܥܒ̈ܕܢܐ ܚܕܟܐ ܦܬܘܟܐ ܘܕܠܐ ܓܪܘܡܐ ܓܘ ܡܫܠܡܝ ܠܓܪܘܡܝܗܝ ܒܟܪ̈ܝܬܐ ܕܫܟܠܘܪܬܐ ܕܡܬܪܒܝܢܝܗܝ . ܡܝܬܢܐ ܕܡܫܘܚܬܗܝ ܗܠܝܗ ٥ ـ ٨ ܡܝܟܪܘܡܝܛܪ . ܘܟܠܝܗܝ ܐܣܦܝܪ̈ܐ ܓܠܝܕܐ ܕܐܘܟܣܓܝܢ ܘܕܝܘܟܣܝܕ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ . ܡܫܟܠܠܘ ، ܢܘܓܒܬܐ ܕܗܝܡܘܓܠܘܒܝܢ . ܘܗܝܡܘܓܠܘܒܝܢ ܗܘ ܗܠܝܗ ܡܥܒܕܢܐ ܠܓܘܢܐ ܣܡܘܩܐ ܕܕܡܐ . ܘܡܫܘܚܬܗ ܡܢ ٩٠٪ ܡܢ ܝܘܩܪܐ ܕܦܪܘܛܝܢܐ ܕܐܣܦܝܪ̈ܘܬܐ ܣܡܘܩܬܐ . ܡܢܝܢܐ ܡܝܬܢܝܐ ܕܐܣܦܝܪ̈ܘܬܐ ܣܡܘܩܬܐ ܕܕܡܐ ܓܘ ܓܒܪܐ ܗ.٥ ܡܠܝܘܢ ܐܣܦܝܪ̈ܐ . ܓܘ ܚܕ ܡܠܝܡܝܛܪܐ ܡܩܘܒܐ . ܘܓܘ ܢܫܐ ٥ ܡܠܝܘܢ ܐܣܦܝܪ̈ܐ ܒܩܪܝܒܘܬ .

٥ ـ ١ ـ ٩ ـ ܐܣܦܝܪ̈ܘܬܐ ܚܘܪ̈ܬܐ ܕܕܡܐ (Lencocytes) :

ܗܠܝܢ ܚܘܠܝܐ ܕܠܐ ܓܘܢܐ . ܦܪܝܫܐ ܝܢܐ ܡܢ ܐܣܦܝܪ̈ܘܬܐ ܣܡܘܩܬܐ ܒܐܝܬܝܘܬܐ ܕܓܪܘܡܐ . ܘܦܫܝܛܝ ܡܙܘܕܝܢܐ ܠܟܪܝ ܒܚܝܘܬܐ . ܠܦܘܬ ܐܝܬܘܬܐ ܕܦܪܕܬ̈ܘܢܝܬܐ ܓܘ ܫܡܘܦܠܘܡ .

١ ـ ܚܘܠܝܐ ܠܡܦܐܝܐ (Lymphocytes) : ܗܠܝܢ ܚܘܠܝܐ ܐܣܦܝܪ̈ܘܢܝܬܐ ܙܥܘܪ̈ܐ ܫܡܘܦܠܘܡ ܡܟܣܝܢܐ . ܠܥܘܬܐ ܕܚܘܠܝܐ . ܡܫܟܠܝ ܐܝܢܐ ܚܘܠܝܐ ܓܪܐ ܐܝܟܢܐ ܒܡܦܪܫܬܐ ܕܠܡܥܢܐ ܕܥܘܕܠܝܬܐ . ܐܝܟ ܕܡܟܝܘܢ ܠܚܡܡܐ ܒܡܕܥܝܬܐ . ܚܠ ܕܐܝܬ ܒܦܟܝ ܠܗ ܕܘܟܬܐ ܕܝܟܢ̈ܐ . ܒܐܝܬܝܘܬܐ ܕܡܪܕܝܬܐ ܡܝܠܘܟܝܘܬܢܝܬܐ ܢܟܝܪܐ .

٢ ـ ܚܘܠܝܐ ܚܕܢܝܬܐ (Monocytes) :

ܡܕܡܝ ܠܚܕ ܗܣܘܡܐ ܠܚܘܕܐ . ܠܚܘܠܝܐ ܠܡܦܐܝܐ ܙܥܘܪܬܐ . ܘܦܪܝܫܐ ܝܢܐ ܒܫܡܘܦܠܘܡ ܡܟܣܝܢܐ . ܘܓܪܘܡܐ ܒܘܠܟܘܢܝ ܐܣܡܝܐ . ܡܟܝܡܘܬܐ ܕܠܗ ܚܘܠܝܐ ܚܕܢܝܬܐ . ܒܡܫܥܬܐ ܠܠܥܢܝܬܐ ܠܚܡܥܕܐ . ܘܡܫܘܡܐ ܠܚܘܕܐ ܡܝܟܪܘܒܝܐ . ܡܫܠ ܐܝܟ ܐܒܕܠܘ ، ܐܝܘܡܐ ܡܦܪܕܢܐ .

ܕ. ܠܘܩܝܛܘ̈ܬܐ ܚܘܪ̈ܬܐ ܕܕܡܐ ܦܪܕܬܢܝܬܐ :

ܐܝܬܝܗ ܒܓܘܪ̈ܐ ܠܘܩܝܛܘ̈ܬܐ ܐܚܪ̈ܢܝܬܐ. ܐܝܟܠܗܘܢ ܚܕ ܡܢ ܓܪܘܡܐ ܡܚܐ ܒܗܠܝܢ ܘܡܬܦܠܓܢ ܦܪܕ̈ܢܝܬܐ ܘܦܬܝܢ ܡܢ ܡܘܪ̈ܝܐ ܥܠ ܐܝܟ ܕܡܝܬܐ ܕܐܝܢ ܦܪܕܬܢܝܬܐ ܠܡܬܚܕܐ. ܘܡܬܚܒ ܠܐܪ̈ܒܥ ܕܦܐܬܐ ܗܢܐ

١. ܢܝܘܛܪܘܦܝܠ (Neutrophil) : ܐܝܟܠܗܘܢ ܐܝܟ ܠܘܩܝܛܘܬܐ ܚܘܪܬܐ ܕܡܬܪ̈ܬܐ ܐܚܪ̈ܢܝܬܐ. ܘܡܬܢܝܐ ܒܠܠܟܝܢܐ ܠܚܝܠܐ ܐܚܪ̈ܢܝܬܐ. ܘܡܬܢܝܐ ܒܠܠܟܝܢܐ ܠܚܝܠܐ. ܘܠܗܘܢ ܢܦܫܐ ܕܚܝ̈ܐ. ܚܕܐ ܠܦܪ̈ܕܬܐ ܦܪܕܬܢܝܬܐ ܕܐܝܟ ܗܘܕܪܐ ܗܢܝܢ. ܒܡ ܡܬܝ ܕܚܕܪ ܡܢ ܠܗ ܠܗܘܕܐ ܕܡܘ̈ܬܐ ܕܡܢܐ ܡܬܒܢܝܐ. ܘܦܠܛܝܢ ܡܢ ܒܘܪܬܐ ܕܡܕܐ. ܕܠܐ ܡܬܚܝܠܐ ܕܢܚܬܐ ܥܠ ܠܗܘܕܐ ܕܐܝܟ ܗܕܐ. ܘܡܢ ܠܗ ܡܬܚܙܝܐ ܐܚܪ̈ܢܝܬܐ. ܗܟܢ ܒܝܢ ܗܘܕܐ ܕܠܗܘܕܐ ܡܬܚܝܢܐ. ܘܡܬܚܝܢ ܐܚܪ̈ܢܝܬܐ ܒܡܬܕܘܪܐ ܠܐܪܥܐ ܕܒܕܐ ܦܠܛܐ

٢. ܐܣܝܕܘܦܝܠ (Acidophil) : ܦܪܕܬܐ ܗܢܐ ܒܚܕ ܠܒܘܫܐ ܕܐܝܟ ܦܠܛܐ ܕܪܐ ܠܗ ܘܐܝܬܝܗ ܟܡܝܢܐ ܒܚܠܘܐ ܕܦܘܪܫܢ. ܕܒܐ ܒܪܐ ܒܪܒܘܬܐ. ܠܗ ܐܝܢܝܘܬܐ ܕܪ ܠܗܡܢܕܘܬܐ. ܘܐܝܟ ܒܢܘܢܕܘܬܐ ܒܐܝܢܝܘܬܐ ܡܕܟܝܢܐ ܕܐܠܪܓܝܐ. ܐܝܟ ܦܠܛܐ ܒܢܦܫܐ ܗܘܠܟܐ ܦܪܦܠܛܐ.

٣. ܒܐܣܘܦܝܠ (Basophil) : ܠܪܘܦܝܗ ܡܕܡܐ ܠܠܗܘܕܐ ܕ S . ܡܬܚܙܝܐ ܐܝܢܝܘܬܗ ܒܡܠܟܝܘܬܐ ܕܐܢܝܡܐ ܕܦܘܪܫܢ. ܗܘ ܕܡܥܠܐ ܠܦܠܛܘܬܐ ܕܕܡܐ.

ܗ. ١. ١٠ ـ ܡܢܝܢ ܕܡܐ ܐܦ ܠܘܩܝܛܘܬܐ ܕܡܢܝܢܐ :

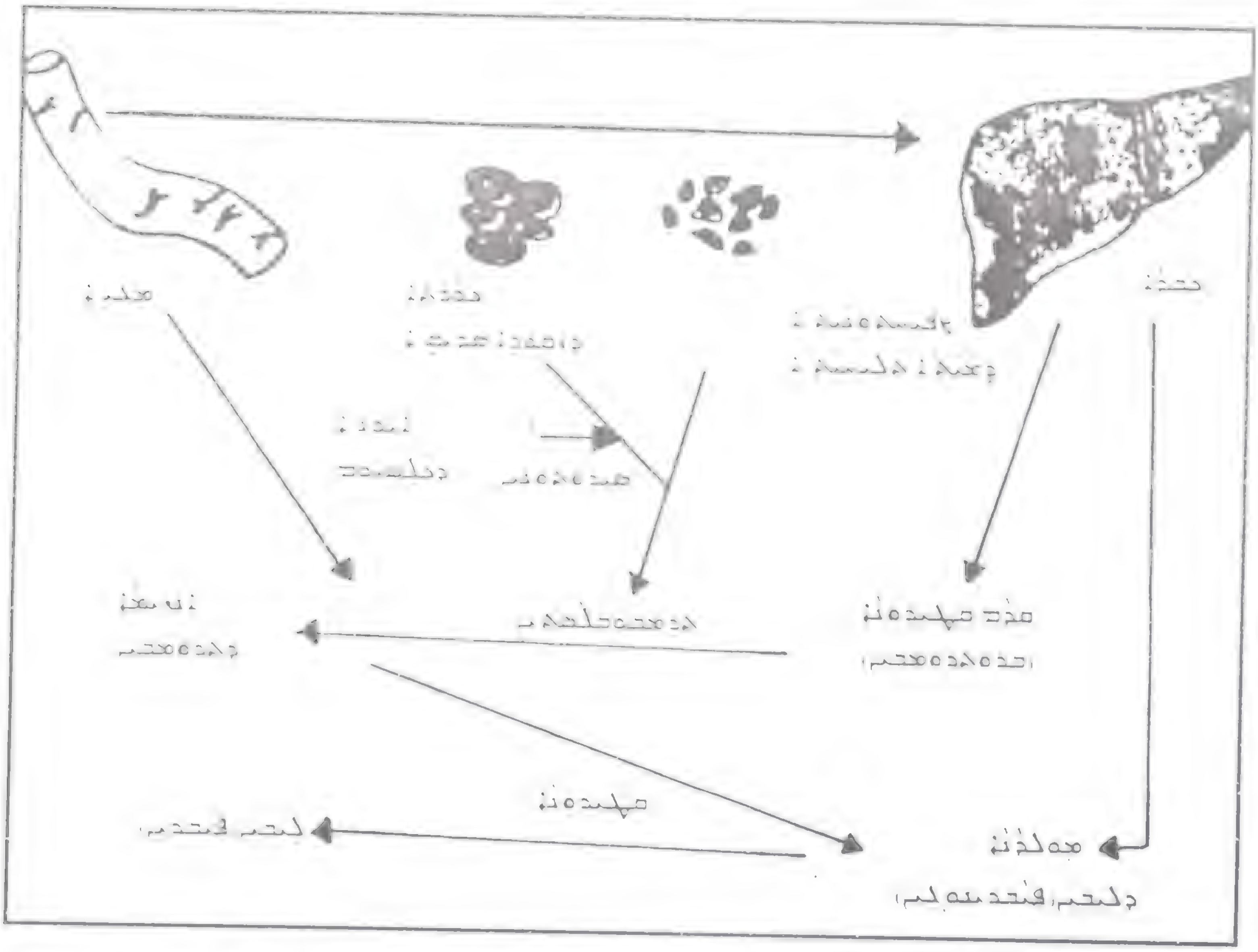
ܘܐܝܬܝܗ ܟܡܝܢܘܬܐ ܚܘܪܘܦܠܘܡܝܬܐ ܕܠܐ ܐܝܟ ܚܘܕܪ̈ܢܝܬܐ. ܐܘ ܒܟܡܝܢܘܬܐ ܐܚܪ̈ܢܝܬܐ. ܡܦܠܛ ܐܝܬܝܗ ܒܝܢ (4 . 2) ܡܠܝܘܢܝܬܐ. ܘܡܦܠܛ ܚܕ ܐܠܦܐ ܐܢܫܐ ܒܦܠܛܘܬܐ ܕܕܡܐ. ܡܢܝܢܐ ܕܠܘܩܝܛܘܬܐ ܕܡܢܝܢܐ ܐܝܬܝܗ ܐܝܟ ٢٠٠٠٠٠ ـ ٤٠٠٠٠٠ ܠܗ ܚܕ ܡܠܝܡܬܪܐ ܡܪܒܥܐ.

ܗ. ١. ١١ ـ ܦܠܛܘܬܐ ܕܕܡܐ (Blood Platelets) :

ܡܬܩܪܝܢܐ ܐܦ ܦܠܛܘܬܐ ܕܕܡܐ ܚܕܐ ܗܠܟܘܬܐ ܚܘܪܬܢܝܬܐ ܕܡܘܒܠ ܡܦܠܛܐ ܕܠܗܘܕܐ ܠܕܡܐ. ܠܗ ܐܝܢܝܘܬܐ ܕܦܠܛܐ ܘܡܢܘܬܐ ܡܢܐ ܗܠܟܘܬܐ ܒܟܡܝܢܐ ܡܦܠܛܐ ܕܠܘܩܝܛܘܬܐ ܕܡܢܝܢܐ ܒܟܝܢܐ

ܐܠܝܣܐ ، ܥܒܪܐ ܘܣܘܦܐ ܠܒܕ ܐܝܬܘܗܝ ܦܣܘܢܝܬܐ ܐܢܐ ܡܢܘܚܦ ܒܕ . ܕܝܚܢܐ ܘܡܒܝܠܝܪܘܒܝܢ ، ܒܝܠܝܪܘܒܝܢ ܕܗܝܡܘܓܠܘܒܝܢ ܕܐܝܬܝܗ ܕܦܠܚܬܐ . ܡܕܒܪܢܐ ܕܢܝܚܐ ܠܟܠܝܬܐ ܣܘܓܐ ܡܠܘܐܐ ܚܕ ܐܝܟ ܒܝܠܝܪܘܒܝܢ ܦܠܚ ܗܝܡܘܓܠܘܒܝܢ ܦܠܚ ܐܦ . ܕܕܡܐ ܠܟܪܝܗܘܬܐ ܡܦܝܣ ܘܒܕܪܐ ܒܝܠܝܪܘܒܝܢ ܕܒܝܠܝܪܘܒܝܢ ܕܡܠܦܬܐ ܒܫܘܠܡܐ ، ܕܦܠܚܘܬ ܕܐܝܢܝܬܐ ܘܟܠܚܘܬܐ ܐܝܢܝܬܐ ، ܠܦܠܚܬܐ ܠܗ ܡܙܝܕܐ ܡܫܘܚܬܐ ܐܝܟ ܣܓܝܐܐ ܐܝܢܝܬܐ ܕܒܝܠܝܪܘܒܝܢ ܐܟܘܬܐ .

ܐܝܢܝܬܐ ܕܒܝܠܝܪܘܒܝܢ ܒܫܘܠܡܐ ܕܡܘܠܕܢܐ ܕܠܒܒܐ (ܦܣܛܘܒܝܠܝܢ) ܘܡܢ ܡܠܘܐܐ ܦܪܘܛܝܢܐ ܡܙܝܕܐ ܠܗ ܦܠܚܐ ، ܠܠܒܒܐ (ܚܕ ܡܠܘܐܐ ܦܪܘܛܝܢܐ ܠܐ ܡܙܝܕܐ) . ܘܠܒܒܐ ܗܘܐ ܕܝܘܪܘܒܝܠܝܢ ܕܚܕ ܓܪܒܐ ܕܡܝܐ ܡܢ ܟܠܝܬܐ ܡܢ ܡܪܡܪܐ . ܘܚܕ ܐܝܢܝܬܐ ܝܘܪܘܒܝܠܝܢ ܡܫܘܚܬܐ ܕܡܝܐ . ܘܡܢ ܝܘܪܘܒܝܠܝܢ ܣܛܪܟܘܒܝܠܝܢ ܒܡܝܐ . ܘܐܝܟ ܕܡܝܐ ܡܣܛܪܟܘܒܝܠܝܢ (ܣܛܪܟܘܒܝܠܝܢ) ܟܕ ܒܪܐ ܕܡܫܘܚܬܐ . ܘܡܟܠܗܐ ܕܕܡܐ . ܘܠܝܬ ܠܗ ܡܫܘܚܬܐ ܡܢ ܟܠܝܬܐ ܠܦܠܛܐ ܕܦܠܛܘܬܐ (ܨܘܪܬܐ ٢ - ٢٢) .



ܨܘܪܬܐ (٢ - ٢٢) ܡܦܩܬܐ ܡܫܘܚܬܐ ܠܦܠܛܘܬܐ ܕܣܛܪܟܘܒܝܠܝܢ ܕܕܡܐ .

٥ - ١ - ١٢ - ܦܠܣܡܐ (Plasma) :

ܡܚܕܪܝ ܡܢܐ ܦܣܡܘܬܐ ܕ ٩٠٪ ܡܝܐ . ܐܝܬܐ ܟܪܟܢܐ ܒܠܗ ܦܪܘܬܝܢܐ ܡܫܚܠܦܐ . ܐܝܟ ܓܠܘܒܝܢ ܕܓܠܘܒܘܠܝܢ . ܘܦܝܒܪܝܢܐ ܕܠܒܝܢ (ܦܝܒܪܝܢܘܓܝܢ) . ܘܡܠܘܐܐ ܐܚܪܢܐ ܐܝܟ ܫܟܪܬܐ ܚܡܝܡܬܐ ܘܡܠܚܐ . ܘܡܗܝܢ ܡܘܠܕܢܐ ܕܠܒܝܢ . ܚܕ ܓܒܐ ܐܝܬܘܢܐ ܒܡܓܒܪܘܬܐ ܕܕܡܐ . ܘܡܚܠܐ ܦܪܐ ܟܕ ܡܓܒܪܘܬܐ ܕܕܡܐ . ܒܠܗ ܡܙܠܐ ܕܕܡܐ (Serum) . ܘܠܐ ܠܗ ܡܙܢܬܐ ܠܡܙܠܐ ܕܕܡܐ ܕܡܓܒܪ . ܠܡܢܐ ؟

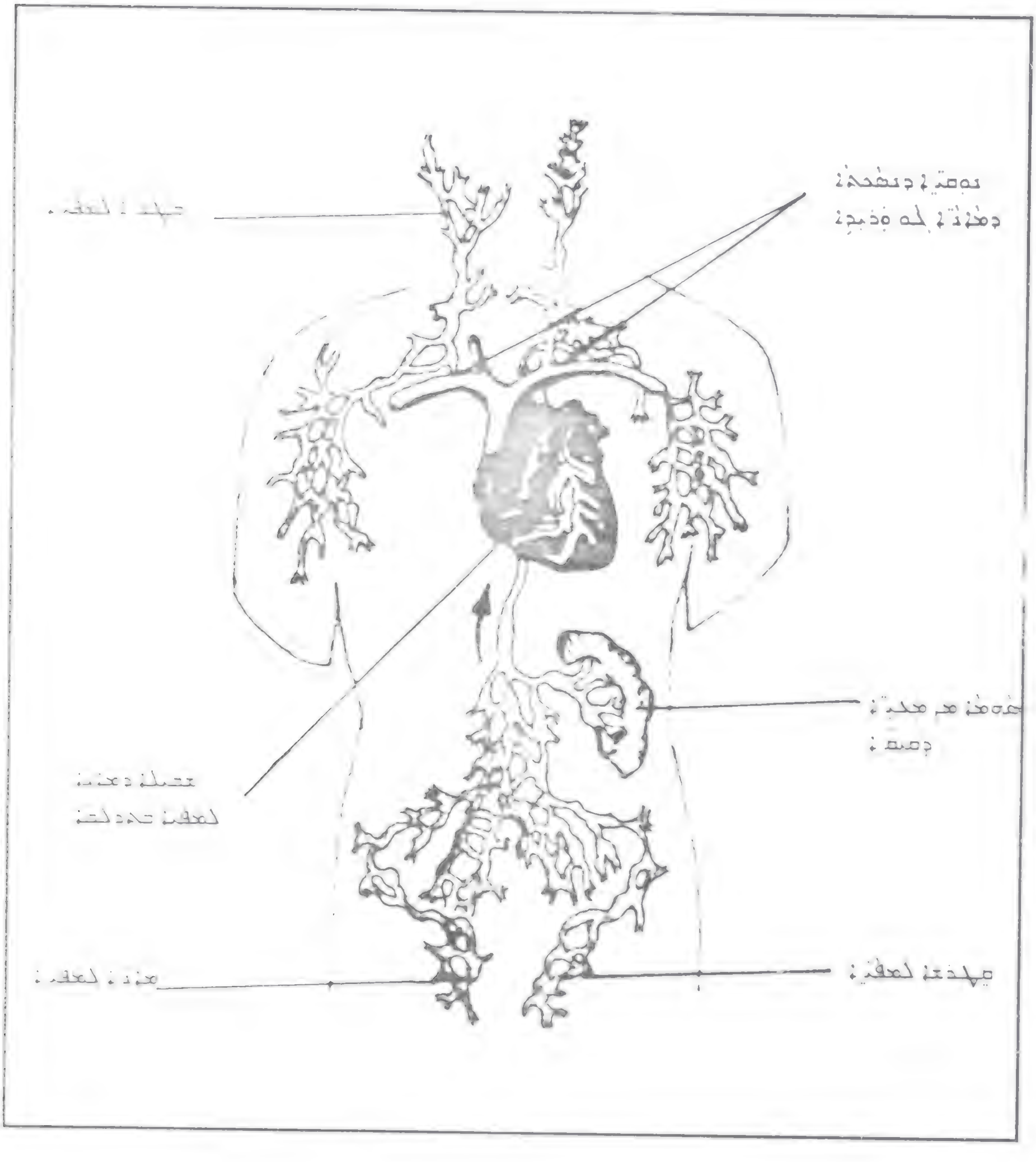
٥ - ٢ - ܐܘܪܚܬܐ ܠܡܦܐ (Lymphatic) :

ܒܠܗ ܓܒܪܐ ܕܡܘܬܒܢܝܬܐ ܡܢܐ ܚܕ ܙܘܓܐ . ܡܚܘܝ ܠܚܝܠܐ ܘܡܘܪܢܐ ܘܪܕܝܐ ܕܡܬܒܝܢܠܗ ܠܕܘܪܬܐ ܕܡܢܬܐ ܠܗܘܢܬܐ . ܘܡܗܝܢ ܐܘܪܚܬܐ ܠܡܦܐ ܐܦ ܚܕ ܓܒܐ ܐܝܬܘܢܐ ܒܕܪܕܘܬܐ ܕܡܘܪܡܐ ܐܝܟ ܕܟܬܒܝ ܠܦܓܪܐ . ܡܬܘܪܝܐ ܒܠܗ ܐܘܪܚܬܐ ܠܡܦܐ ܡܢ ܡܝܬܘܬܢܝܬܐ ܘܡܢܝܢܐ ܘܟܘܟܒܐ ܘܡܘܪܢܐ ܠܡܦܐ . ܘܡܪܡܝ ܠܘܪܝܐ ܕܡܝܬܘܬܢܝܬܐ ܠܡܦܐ . ܠܓܘܪܝܐ ܕܡܝܬܘܬܢܝܬܐ ܕܡܢܝܬܐ . ܐܝܬܐ ܐܝܟ ܒܝܬ ܡܕܝ ܢܦܘܬܘܬܐ ܡܢܐ . ܗܕܟܐ ܐܝܟ ܟܬܒܝ ܒܟܒܝܬܐ ܕܡܢܬܘܬܢܝܬܐ ܕܘܪܒܬܐ ܠܓܘܡܣ . ܘܡܝܬܘܬܢܝܬܐ ܠܡܦܝܬܐ ܗܒܝܢܬܝ ܦܪܟܝܘܬܐ ܡܢܐ ܒܠܒܣ ܓܒܝܢܐ ܕܦܓܪܐ . ܘܟܒܘܫ ܡܢ ܐܘܪܚܬܐ ܓܢܝܐ ܡܝܗܪܘܬܐ . ܘܠܦܦܐ ܕܡܘܚܐ . ܘܐܗܦܟܪܘܬܐ ܕܟܢܬܐ ܘܐܕܢܐ ܓܘܫܬܐ ܘܡܪܘܗܝܐ ܘܦܬܐ ܕܓܠܕܐ .

ܡܢܝܢ ܡܝܬܘܬܢܝܬܐ ܠܡܦܝܬܐ ܠܚܝܠܐ ܘܡܘܪܢܐ . ܕܦܝܫܐ ܒܠܗ ܒܕܒܠܐ ܟܕܪ ܕܟܪܟܗ ܠܒܢܐ ܡܝܬܘܬܢܝܬܐ ܒܠܡܦܐ . ܠܡܢܝܐ ܠܡܦܐ ܒܝܬ ܓܒܘܪܐ . ܐܝܬܐ ܙܡܝܢܐ ܐܝܬܠܗܘܢ ܙܡܝܢܐ ܟܬܒܝ ܒܟܒܝܬܐ ܕܠܡܦܐ ܒܚܕ ܙܘܓܐ . ܘܐܝܬܠܗܘܢ ܓܘܪܝܐ ܒܝܬ ܕܡܝܟܐ ܡܢ ܓܘܪܝܐ ܕܘܪܝܕܐ . ܟܦܟܝ ܐܝܬܐ ܡܢܝܐ ܓܘ ܗܕܝ ܒܘܒܝܐ ܠܡܦܝܬܐ ܙܪܕܢܝܬܐ . ܗܡܠܐ ܘܢܡܝܢܐ . ܐܝܟ ܕܟܦܟܝ ܒܓܒܪܗ ܓܘ ܗܕܝ ܦܪܝܕܐ ܗܣܘܗ ܗܪܡܘܬܢܝܐ (ܐܗܟܡܬܐ ٢ - ٢٣) .

ܗܕܝ ܠܡܢܝܐ ܠܡܦܐ . ܘܡܘܪܐ ܠܡܦܐ ܒܕܒܠܐ ܒܡܝܬܘܪܘܬܐ (Nodules) . ܐܘ ܡܝܬܪܐ ܠܡܦܐ (Lymph Nodes) . ܘܐܝܬܐ ܦܠܚ ܟܠ ܡܦܪܫܬܐ ܕܠܡܦܐ ܡܢ

ܠܡܥܝܐ ܙܥܘܪܐ ܘܪܘܪܒܐ . ܘܒܥܒܪܢܐ ܕܩܠܝܬܐ ܕܠܡܦܐ ܡܢ ܦܠܓܐ
ܠܡܦܐ ، ܗܠܝܢ ܟܠܗܘܢ ܡܬܟܢܫܝܢ ܒܩܢܝܐ ܠܡܦܝܐ .



ܨܘܪܬܐ (٢ - ٢٣) ܐܘܪܚܬܐ ܠܡܦܐ ܓܘ ܒܪܢܫܐ .

٣ ـ ܫܪܒܐ ܕܐܘܪܚܬܐ ܡܪܢܝܬܐ .

٣ . ١ ـ ܫܪܒܐ ܕܝܘܡܐ :

ܡܢ ܐܝܟ ܫܪܒܐ ܗܢ ܐܢܫܐ ܕܝܘܡܐ ܗܘ ܒܕܪ̈ܬܐ ܘܫܘܐ ܒܐܘܟܡܐ ܠܒܢ̈ܝܐ ܐܥܕܐ ܕܟܘܪܟܐ ܘܫܘܒܚܐ ܘܝܘܡܐ ܕܦܨܚܐ ܚܕ ܫܒܐ . ܘܡܢ ܗܘ ܕܐܘܐ ܫܪܒܐ . ܡܢ ܝܘܡܐ ܒܩܘܪܒܢܐ ܕܡܫܝܚܘܬܐ ܠܥܢ̈ܝܐ . ܐܘܟܝܬ ܡܫܝܚܘܬܐ ܕܝܘܡܐ . ܘܡܫܬܐ ܐܠܗ ܡܢ ܕܡܫܬܒܚ ܐܠܗ ܡܢ ܩܠܝܠܐ ܕܩܪܒܐ . ܒܪܐ ܠܡܫܬܝܚ ܗܘ ܒܘܡܐ ܩܪ̈ܒܐ ܘܐܘܟܡܐ ܡܢ ܫܝܚܐ ܒܡܫܝܚܘܬܐ . ܘܗܘ ܒܗܘ ܒܪܐ . ܡܪܝܡ ܠܒܘܪܟܐ ܡܫܝܚܐ ܕܦܩܥܬܐ ܕܩܠܝܠܐ ܒܪܝܫܐ ܕܝܘܡ ܫܘܠܦܐ . ܐܝܟ ܕܐܡܝܪ ܐܘܟܡܝܢܐ ܕܒܪܝܟܘ . ܘܡܫܝܚܐ ܠܗ ܠܫܝܚܐ ܒܡܫܝܚܘܬܐ . ܐܝܟ ܕܪܝܫ ܕܐܝܬܐ ܘܕܝܘܡܝܬܐ ، ܡܦܘܫܚܬܐ ، ܠܦܪܘܩܐ ܡܢܗ ܒܐܘܪܚܐ ܕܟܘܪܟܘܒܐ ܕܐܘܫܠܡ ܗܘܦܟܐ . ܐܦ ܡܫܝܚܐ ܝܘܡܐ . ܩܠܝܠܐ ܒܪܘܚܢܝܐ ܕܝܢ ܕܐܘܫܠܡܐ . ܐܝܟ ܐܡܪܝܢܐ ܘܡܘܕܝܢܐ . ܠܝܘܡܐ ܕܡܦܩܢܘܬܐ ܐܝܟ ܕܪܒܝ ܒܫܠܡܐ ܘܫܠܡܐ .

ܕܘܩܕܐ ܐܠܝܢ ܫܪܒܐ ܪܫܢܐ . ܡܫܘܕܥ ܝܘܡܐ ܒܡܫܝܚܘܬܐ ܕܕܪܝܐ ܕܡܫܝܚܘܬܐ ܕܩܝܡܬܐ . ܒܡܫܠܡܢܘܬܐ ܕܡܫܝܚܘܬܐ ܒܪܝܬܐ ܠܗ ܘܫܘܪܐ . ܘܗܝܘܡܐ ܒܫܒܬܐ . ܘܡܢ ܠܗ ܐܘܪܚܬܐ ܠܪܘܚܬܐ . ܡܫܠܡܝܢ ܒܫܘܪܝܐ ܡܪܢܝܬܐ ، ܫܘܪܝܐ ܕܝܘܡܐ ܠܗ ܡܠܬܐ ܡܪܢܝܬܐ ܕܝܘܡܐ ، ܒܝܠܕܐ . ܘܡܫܠܡ ܝܘܡܐ ܘܩܪܝܐ ܡܢ ܫܡܫܐ . ܐܘ ܐܝܟ ܠܡܫܝܚܘܬܐ ܕܦܨܚܐ . ܘܡܫܠܡܐ ܠܪܫܝܬܗ ܕܡܫܠܡܢܘܬܐ ܫܒ ܕܪܫܐ ܕܡܫܝܚܘܬܐ ܐܡܝܢܐ . ܘܠܐ ܡܢܝܚ ܕܝܘܡܐ ܠܗ ܡܫܝܚܘܬܐ ܠܫܘܪܝܐ ܠܡܫܝܚܘܬܐ ܕܡܠܘܐܐ ܒܡܫܝܚܐ ܡܪܢܝ ܡܫܒܚܢܘܬܐ ܠܒܘܪܟܐ ܒܫܘܪܝܐ ܕܫܘܒܚܐ . ܐܝܟ ܗܦܟܬܐ ܐܝܟ ܕܩܠܝܘܗܝ . ܒܫܪܒܐ ܐܝܟܢܐ . ܘܡܫܬܡܥܢܐ ܘܡܠܝܢܐ ܘܡܢܐ .

ܫܒܝ ܝܘܡܐ ܟܠ ܫܒ ܡܢܝܢܐ ܠܐ ܡܠܝܠܐ ܡܢ ܩܪܒܢܐ ܠܗ ܩܠܝܡܐ . ܘܐܝܬ ܩܪܒܢܐ ܐܝܬܠܗܘܢ ܫܪܒܐ ܪܒܐ . ܒܡܫܒܚܢ ܡܢܝܢ ܡܢ ܕܐܝܬܝܗ ܗܢܐ :

١ ـ ܗܘܝ ܫܒ ܒܝܬ ـ ܡܦܩܐ ܩܪܒܢܐ . ܡܬܩܢ ܐܠܗ ܩܠܝܠܐ . ܒܫܘܪܝܐ ܕܡܫܝܚܘܬܐ ܪܒܬܐ ܠܩܪܒܢܐ ܐܝܟ ܕܝܠܗ ܐܡܝܢܘܬܐ ܒܫܘܪܝܐ ܕܫܠܡܘܬܐ ܠܦܩܢܐ ܠܡܫܝܚܐ ܐܪܝܟܐ .

٢ . ܡܫܘܚܠܦ ܒܡܘܠܕܢܘܬܐ ܕܪ̈ܕܝܐ ܚܡܘܪܐ . ܠܗ ܡܠܝܐ ܕܡܫܐ ܘܡܫܘܢܝܬܐ ܕܡܠܚܐ . ܠܡܕܒܪܢܘܬܐ ܕܝܘܠܦܐ ܠܦܓܪܐ . ܘܠܚܠܝܐ ܡܢ ܕܡܐ ܠܡܘܕܐ .

٣ . ܦܠܚ ܣܕܡܐ ܦܪܘܫܝܐ . ܐܝܟ ܚܠܘܦܐ ܠܙܘܪܡܘܝܐ ܘܡܚܡܕܐ (ܕܪܘܚܐ) .

٤ . ܡܢܛܪ ܡܢ ܕܡܘܫܘܬܐ ܕܕܡܐ . ܘܐܝܟܘ ܝܠܗ ܚܡܘܠܐ ܐܝܡܫܐ . ܒܡܘܠܕܢܘܬܐ ܕܪ̈ܕܝܐ ܕܕܡܐ ܐܝܡܫܐ . ܠܐܡܕܐ ܕܚܝܘܬܐ ܕܚܝܘܬܐ .

٥ . ܦܠܚ ܒܡܘܠܝܐ ܕܫܘܬܦܘܬܐ ܒܡܫܠܬܐ ܐܝܟ ܢܛܘܪܐ (Buffers) . ܗܢܐ ܘܗܘ ܐܝܟ ܡܛܟܣܢܝܬܐ ܠܡܘܬܐ ܕܡܡܫܐ ܘܕܪܘܛܝܢܐ (PH) . ܡܛܠ ܡܢܛܪ ܠܡܫܘܚܠܦܘܬܐ ܕܫܡܫܐ ܘܡܛܪܬܐ

٦ . ܡܫܘܚܠܦ ܒܢܛܘܪܘܬܐ . ܡܛܠ ܣܕܡܐ ܡܢܗ ܦܠܚ ܐܝܟ ܠܦܓܪܐ ܕܡܫܘܚܠܦܐ ܠܗ ܕܡܐ ܘܒܦܠܚ ܒܝܘܡܐ ܦܫܘܛܐ . ܒܫܘܬܐ ܥܠ ܠܒܐ ܕܕܡܐ ܒܡܫܘܚܠܦܘܬܐ ܕܫܘܦܐ ܢܚܫܘܬܐ . ܒܕ ܣܕܪܗ ܠܗ ܦܢܝܬܐ ܕܦܓܪܐ ܒܡܫܘܚܠܦܘܬܐ ܕܡܟܠܬܐ ܠܒܐ

٦ . ٢ _ ܥܒܕܬܐ ܕܠܒܐ :

٦ . ٢ . ١ _ ܡܫܚܬܐ ܕܠܒܐ :

ܗܝ ܡܫܚܬܐ ܕܠܒܐ . ܐܘ ܡܫܚܬܗ ܡܢ ܡܩܘܕܐ ܕܟܘܡܟܪܬܐ ܕܠܒܐ (Systole) ܘܦܬܚܬܗ (Diastole) ܘܡܟܘܡܝܐ ܝܠܗ ܡܢܝܢܐ ܕܡܫܚܬܐ . ܒܡܟܡܐ ܕܚܝܘܬܐ ܕܒܪܢܫܐ ܒܐܝܟ ٢.٥ × ٩١٠ ܡܫܚܬܐ . ܐܝܢܐ ܗܝ ܕܚܕ ܕܦܠܗ ܚܕ ܒܪܘܦܐ ܡܢ ܕܡܐ ܠܡܟܡܐ ܒܝܬܗ . ܦܫ ܡܟܘܡܝܐ ܒܡܠܐ ܘܡܫܟܚ ܡܠܘܝܐ ܠܒܪܐ (ܨܘܪܬܐ ٢ - ٢٤)



ܨܘܪܬܐ (٢ _ ٤) ܕܘܪܐ ܕܡܫܚܬܐ ܕܠܒܐ

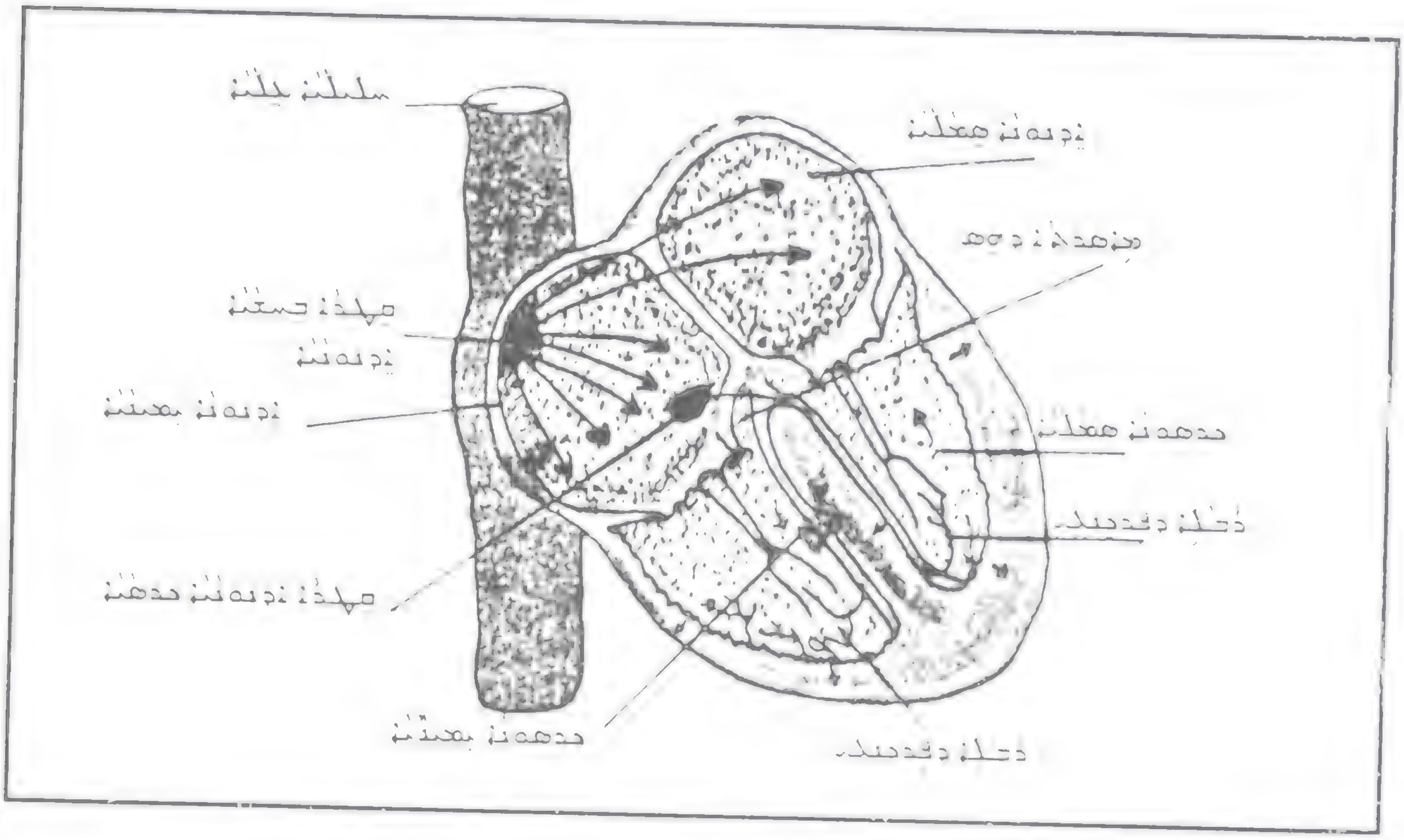
ܦܪܝܫܘܬܐ ܗܝ ܠܡܫܪܪܘܬܐ ܕܠܫܢܐ ܒܗܘܢܝܬܐ ܕܡܩܘܝܢܗ ܗܪܐ ܡܫܘܕܥܐ ܠܡܫܪܪܘܬܗ. ܘܐܢܫ ܕܠܗ ܕܠܫܢܐ ܗܢܐ ܐܝܟ ܕܗܘܐ ܠܝܘܢܝܐ ܡܢ ܟܠ ܡܫܘܕܥܢܐ ܠܫܢܐ. ܕܦܪܝܫܘܬܗ ܒܠܫܢܗ. ܡܢ ܠܗܘܡܐ ܕܝܘܢܝܐ. ܘܐܦ ܗܘܐ ܕܠܗ ܒܗܦܟܐ ܕܠܡܫܪܪܘܬܐ ܡܫܕܪܢܝܬܐ ܕܢܝܫܝܬܐ ܡܛܠ ܒܒܪܝܬܐ ܐܝܟ ܕܐܝܬ ܠܗ ܐܬܘܬܐ. ܐܘ ܕܪܓܐ ܗܘ ܕܡܛܠܬ ܡܬܩܪܐ ܠܡܩܘܕܫܐ. ܠܗ ܐܝܬܝܗܘܬܐ ܕܠܡܫܝܚܐ ܕܠܫܢܐ ܐܚܪܢܐ ܒܗ ܠܡܛܒܥܘܬܐ ܒܝܕܥܐ.

ܘܐܦ ܗܘܐ ܕܠܫܢܘܬܐ ܒܒܕܠܗ ܠܥܕܬܐ ܡܛܝܒܐ ܡܢ ܡܫܡܥܬܐ ܒܐܘܪܚܘܬܐ ܕܝܘܢܝܐ ܕܠܫܢܐ. ܘܕܠܫܢܘܬܐ ܐܪܡܝܬܐ ܕܦܪܝܫܬܐ ܗܝ ܒܗ ܠܡܫܪܪܘܬܐ ܕܠܫܢܐ. ܡܛܠܬܗ ܠܡܫܡܠܝܘܬܐ ܕܟܬܒܐ ܕܣܘܪܝܝܐ. ܡܢ ܩܕܡܐ ܘܠܗܕܐ ܒܗ ܠܟܠܗܝܢ ܡܢܘܬܐ ܕܠܫܢܐ.

ܡܬܚܙܐ ܡܫܘܕܥܐ ܠܫܪܝܪܘܬܗ ܠܗ ܐܪܡܝܘܬܐ. ܡܢ ܩܕܡܐ ܕܢܦܠܐ ܒܫܘܡܐ ܝܠܦܐ ܝܘܢܝܐ ܡܢ ܐܟܘܬܐ ܝܘܢܝܐ. ܩܕܡܐ ܗܝ ܡܬܩܪܝܐ ܒܡܛܠܬܐ ܕܣܦܪܐ ܐܟܘܬܐ (   ) . ܘܡܢ ܒܬܪ ܩܕܡܐ ܦܪܫ ܒܗ ܟܬܒܐ ܣܘܪܝܝܐ. ܕܡܢܗ ܠܡܩܘܕܫܐ ܒܡܢܝܢܐ ܡܢ ܪܦܦܐ. ܘܟܠܗ ܐܝܟ ܒܗܟܢܐ ܠܗܕ ܐܬܘܬܐ ܕܟܠܗܝܢ ܩܕܡܝܬܐ. ܗܘ ܕܡܩܒܠ ܠܟܠܗ ܠܗܕܐ ܩܠܝܐ. ܩܠܝܐ ܝܠܝܦܐ ܡܬܩܪܝܢ ܡܢ ܗܕܐ ܐܟܘܬܐ. ܘܩܠܝܐ ܐܚܪܢܐ ܡܬܩܪܝܢ ܡܢ ܗܕܐ ܒܪܗܝܬܐ. ܡܛܠ ܐܬܘܬܐ ܠܗܠܝܢ ܕܠܫܢܘܬܐ ܕܡܫܡܠܝܬܐ ܕܟܬܒܐ ܕܣܘܪܝܝܐ.

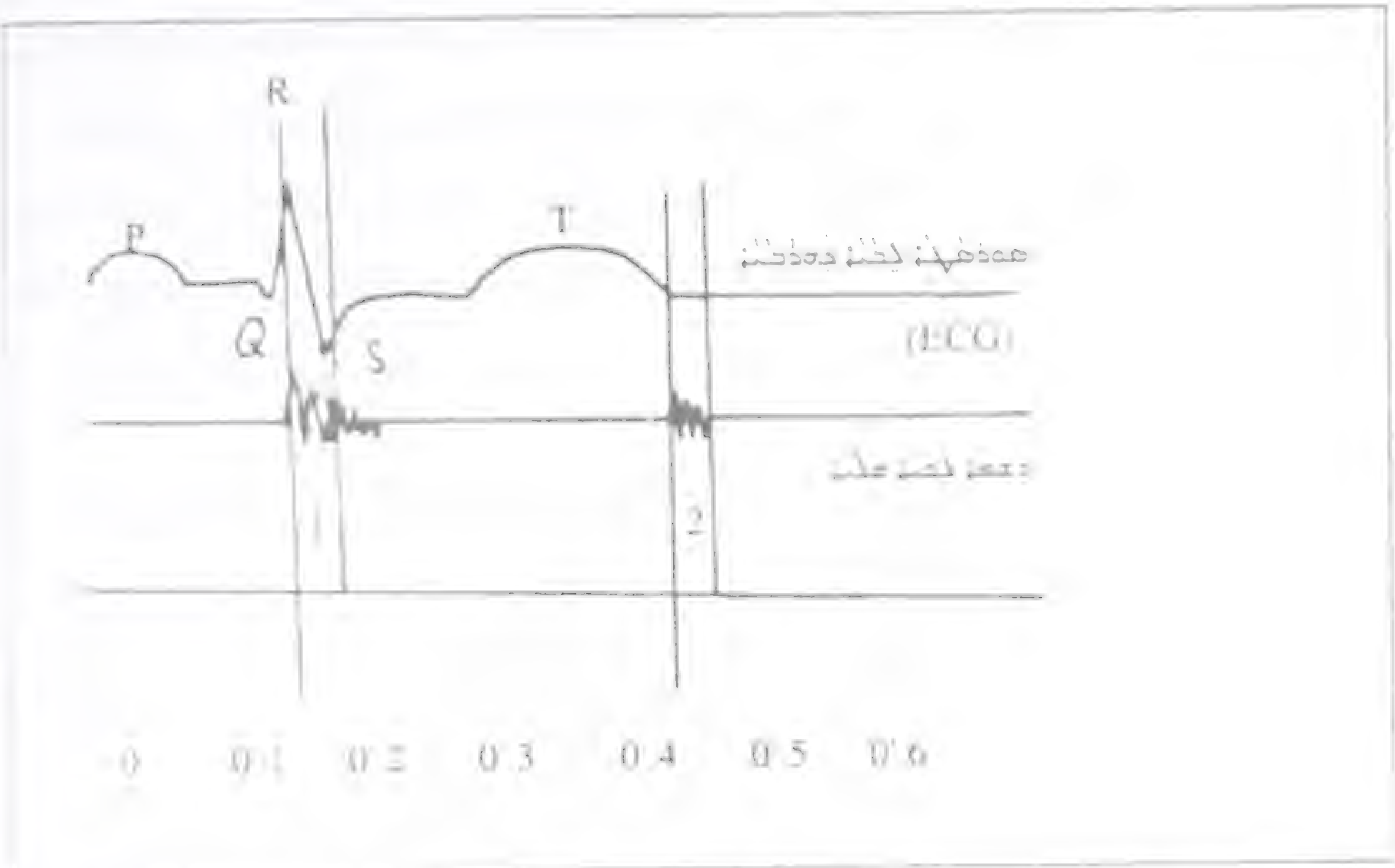
ܘܐܝܟ ܦܘܪܫܢܐ ܒܝܢܬܐ ܕܟܬܒܐ ܣܘܪܝܝܐ ܠܡܫܡܥܘ ܐܚܪܢܐ (ܗܕܐ ܒܪܗܝܬܐ) ܠܐܝܬܘܬܐ ܕܐܝܟ ܡܛܠܬܐ ܐܪܡܝܐ. ܡܬܩܪܝܐ ܡܛܠܬܐ ܝܘܢܝܬܐ. ܒܪܗܝܬܐ (   ) . ܢܦܠ ܥܠ ܐܬܘܬܐ. ܘܩܠܝܗ ܡܢܗ ܕܟܠܐ ܫܒܥܐ ܠܐܬܘܬܐ ܐܪܡܝܬܐ. ܗܘ ܕܡܩܒܠ ܠܟܠ ܠܩܠܝܐ ܝܘܢܝܐ ܘܩܠܝܐ ܡܫܠܡܐ. ܡܬܩܪܝ ܕܟܠܐ ܚܕܬܐ ܡܢ ܡܛܠܬܐ ܝܘܢܝܬܐ. ܒܪܗܝܬܐ ܚܕܐ ܡܬܩܪܝܐ ܡܬܩܪܝܬܐ (ܡܬܩܪܝܐ ܕܗܘ) . ܐܦܪܝܢ ܠܗܕܐ ܦܪܝܫܐ. ܦܪܝܫܐ ܝܘܢܝܐ ܘܦܪܝܫܐ ܡܫܠܡܐ. ܡܬܚܙܐ ܟܠ ܦܪܝܫܐ ܠܐܬܘܬܐ ܕܒܪܗܝܬܐ. ܗܘ ܕܡܛܠ ܒܗ ܕܟܠܐ ܠܡܫܪܪܘܬܐ ܡܬܩܪܝܢܐ. ܩܕܡ ܡܬܩܪܝܐ ܕܟܠܐ ܕܦܪܝܫܝܢ. ܡܬܚܙܐ ܠܡܫܡܠܝܘܬܐ ܕܟܬܒܐ ܠܐܬܘܬܐ ܠܡܫܪܪܘܬܐ (ܐܣܟܡܐ ٢ ٢٥) .

ܘܩܒܝܠܐ ܠܗ ܡܕܡܐ ܩܛܪܐ ܟܣܝܢܝܐ ܐܕܘܢܝܐ. ܘܡܕܒܪܢܐ ܕܦܣܥܬܐ (Pace maker). ܘܗܘ ܡܥܒܕ ܠܡܘܙܥܬܐ ܕܠܒܐ. ܕܗܢܐ ܠܢܩܫܬܐ ܒܚܕܐ ܩܛܝܢܬܐ ܒܩܠܝܠܘ ٧٠ ܙܒܢܐ ܒܚܕܐ ܩܛܝܢܬܐ. ܡܛܠ ܗܢܐ ܒܡܕܒܪܢܐ ܕܦܣܥܬܐ. ܘܐܝܬ ܠܗܘܢ ܐܕܘܢܝܐ ܘܬܪܬܝܢ ܠܗܘܢ ܒܪܘܟܝܐ.



ܐܣܟܡܐ (٢ - ٢٥) ܡܚܘܝܐ ܠܡܪܕܝܬܐ ܕܚܘܦܛܐ ܕܙܘܥܐ ܢܩܘܫܝܐ ܠܡܫܬܐ ܕܠܒܐ ܠܘ ܠܘܬ ܕܠܒܐ.

ܘܡܛܠ ܕܡܬܚܙܐ ܚܘܦܛܐ ܕܙܘܥܐ ܕܠܒܐ ܠܘ ܬܪܬܝܢ ܘܚܘܝܬܐ ܕܒܝܬܐ. ܒܡܫܟܚܘܬܐ ܕܡܘܣܦܐ ܐܠܟܬܪܘܢܝܐ. ܠܡܛܐ ܠܗܢܐ ܕܡܛܠ ܠܛܝܒܐ ܕܠܡܣܟܐ ܡܢ ܚܘܦܛܐ ܕܙܘܥܐ. ܡܚܘܝܘ ܠܗܢܐ. ܘܡܣܡܟܐ ܠܗ ܐܣܟܡܐ ܒܡܢܝܢܐ. ܗܘ ܕܡܬܩܪܐ ܟܠܝܐ ܡܥܒܕܐ ܒܡܘܙܥܬܐ ܕܠܒܐ ܕܙܘܥܐ ܘܪܫܡ ܐܠܗ (E.c.g) Electro Cardio Graph (ܐܣܟܡܐ ٢ - ٢٦).



ܐܣܟܡܐ (٢ - ٢٦) ܣܘܦܛܐ ܕܡܘܙܓܐ ܠܘܬ ܠܡܫܚܬܐ ܕܠܒܐ ܡܬܦܬܚܢܐ ܒܡܘܙܓܐ ܕܠܒܐ ܕܡܘܙܓܐ (E.C.G) . ܐܝܟ ܐܘܐ ܣܘܦܛܐ ܙܠܠܐ (P) ܢܡܘܦܬܐ ܠܡܫܚܬܐ ܕܡܕܝ ܐܕܢܝܬܐ . ܘܙܠܠܐ (QRS) ܢܡܘܦܬܐ ܠܡܫܚܬܐ ܕܡܕܝ ܒܪܫܘܢܐ ܘܙܠܠܐ (T) ܢܡܘܦܬܐ ܠܦܬܝܚܘܬܐ ܕܡܕܝ ܒܪܫܘܢܐ .

٦ - ٢ - ٢ ـ ܙܪܒܐ ܕܕܡܐ :

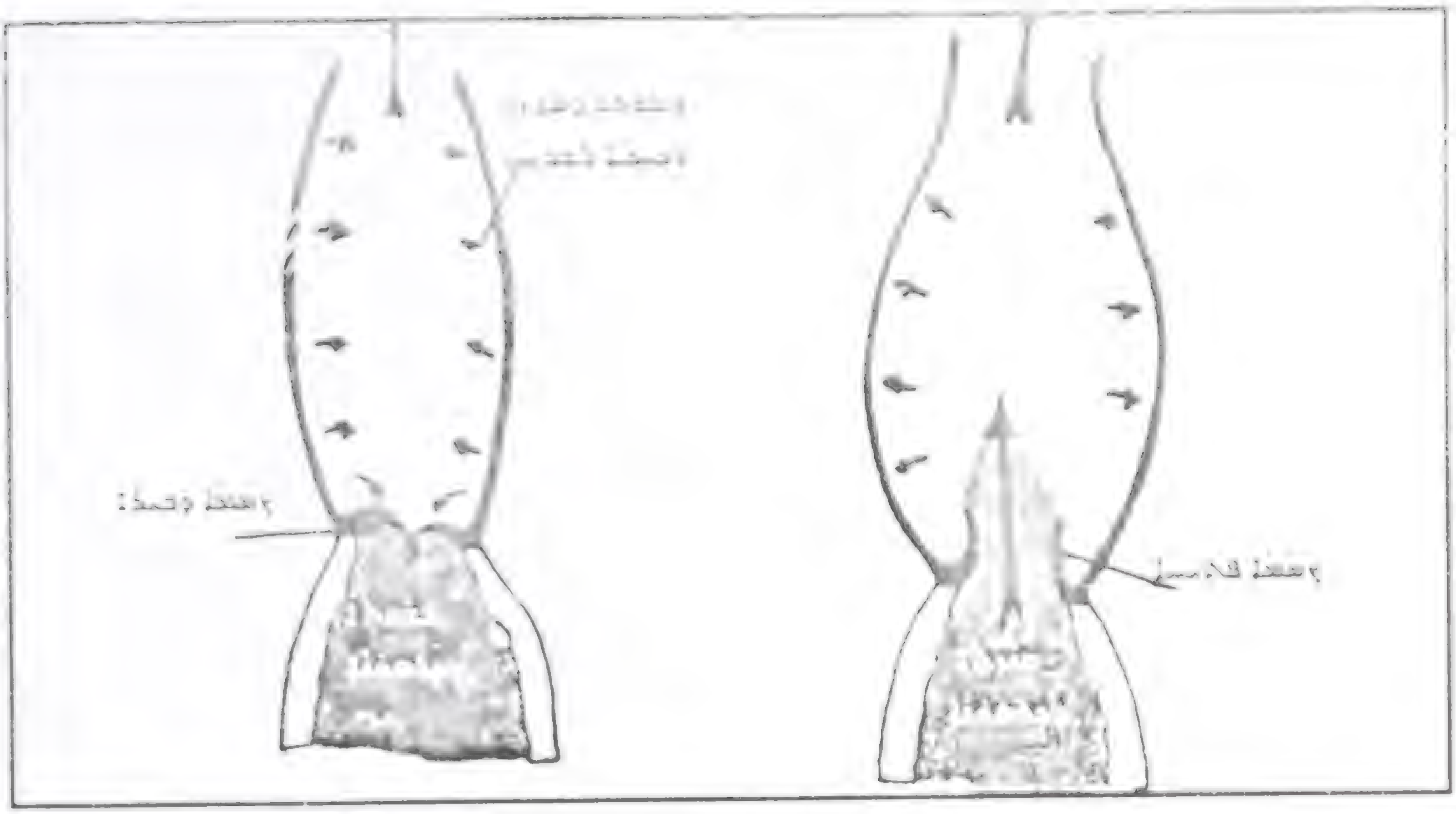
ܐܝܬܐ ܡܢ ܡܬܬܒܝܢܘܬܐ ܙܪܒܐ ܕܕܡܐ ܐܝܠܗ ܡܬܒܝܢܐ ܙܪܒܐ ܬܪܝܢܐ ܐܝܟܢܐ ܕܝܢ ܙܪܒܐ ܕܕܡܐ ܥܠ ܡܕܢܝܢܐ ܕܬܪܝܢܐ ܒܗܕܐ . ܘܬܪܝܢܐ ܠܟܘܕܐ ܦܪܝܫܐ ܡܢܗ . ܘܡܬܝܒܠܐ ܕܪܗܛܐ ܠܙܪܒܐ ܕܕܡܐ . ܠܘ ܦܫܝܛܐ ܐܝܟ ܝܬܝܪܐ ܡܢ ܐܘܪܚܐ ܕܣܘܕܪܐ . ܘܠܐ ܡܢ ܕܒܪܬܐ ܕܥܡܩܐ ܕܡܐܢܐ ܕܡܫܚܐ . ܘܬܐܡܪܝܢ ܙܪܒܐ ܕܕܡܐ ܡܬܬܪܝܨܢܐ ܒܝܬܢܐ ܕܡܬܘܡܬܐ ܗܘܕ ܙܪܒܐ ܕܕܡܐ ܠܘ ܬܪܝܢܐ ܪܬܝܚܐ . ܒܝܬܢܐ ܕܡܬܘܡܬܐ ܗܘܕ ܙܪܒܐ ܠܘ ܐܘܐ ܡܢܐܢܐ ܕܡܫܐ . ܦܫ ܗܠܝܢ ܙܪܒܐ ܕܕܡܐ ܡܬܬܒܝܢ ܒܡܠܚܡܬܐ ܡܢ ܙܒܢܐ (ܡܠܚ ܡܢ ܙܒܢܐ) ܐܝܟ ܕܐܡܪܝܢ ܥܠ ܙܪܒܐ ܐܬܪܝܐ . ܐܘ ܫܘܪܝ ܡܢܗ . ܢܦܫ ܠܙܪܒܐ ܠܘ ܐܘܪܚܐ ܕܣܘܕܪܐ ܒܡܠܦܐ ܕܙܪܒܐ . ܒܗܪܝ ܠܝܒܝܐ ܕܠܒܐ . ܡܢ ܦܠܓܐ ܠܡܫܚܬܐ ܘܦܬܝܚܘܬܐ ܠܘ ܗܪܝ ܒܪܫܘܢܐ ܦܪܝܫܝܬ .

ܘܙܒܢܐ ܕܟܡܐ ܗܘ ܡܢܐ . ܐܢܫ ܕܢܦܩ ܗܘ ܐܦܢܐ ܡܫܝܚܐ . ܐܘܟܝܬ ܐܟܢ ܡܕܝܢܬܐ ܣܠܝܩܬܐ . ܟܠܗ ܘܡܣܟܢܐ . ܗܢܐ ܘܙܒܢܐ ܐܬܐ . ܟܠ ܕܐܝܬ ܦܝܫ ܡܫܘܚܬܐ ܣܓܝܐܬܐ ܘܙܒܢܐ ܐܢܫܘܬܐ ܒܫܢܝܐ . ܘܙܒܢܐ ܕܟܡܐ ܒܕܝܘܬܐ ܡܫܝܚܐ . ܡܢ ܕܡܠܟܘܬܐ ܕܟܡܐ ܐܬܬܘܬܐ ܡܫܝܚܐ ܗܘܐ ܒܙܒܢܐ ܕܫܘܬܐ ܕܡܫܡܫܢܐ . ܗܘܐ ܘܙܒܢܐ ܒܗܘ ܒܠܒܐ . ܡܛܠܬܐ ܕܫܘܬܐ ܐܝܟ ܗ ܕ ܡܠܟ ܐܢܫ . ܡܛܠ ܕܫܘܬܐ ܠܙܒܢܐ ܗܘ ܒܢܝܢܐ ܡܫܝܚܐ ܗܘ ܐܟܢܐ ܐܢܫܘܬܐ ܒܫܠܬܐ . ܕ ܡܠܟܘܬܐ ܐܠܗܐ ܘܙܒܢܐ ܒܐܢܫܘܬܐ ܕܫܘܬܐ . ܘܡܣܟܢܐ ܘܙܒܢܐ ܒܐܢܫܘܬܐ ܕܦܠܚܬܐ . ܕܝܢ ܒܢܝܢܐ ܕܐܬܝܢ ܡܠܟܐ ܠܗ ܒܫܠܝܘܬܐ ܕܟܢܘܫܬܐ ܡܫܝܚܐ . ܒܫܡ ܕܙܒܢܐ ܗܘ ܗܘ ܠ ܕ . ܡܠܟܐ ܒܫܡ ܕܙܒܢܐ ܒܡܦܩ ܠܗ ܠ ܡܠܟܐ ܒܫܡܐ . ܗܘ ܕܟܕ ܠܟܢܘܫܬܐ ܐܢ ܐܢܫܘܬܐ ܠܗ ܕܒܢܝܢܐ ܕܡܫܝܚܐ ܒܢܝܢܐ ܕܐܬܝܢ . ܘܒܢܝܢܐ ܒܢܝܢܐ ܕܡܠܟܘܬܐ ܕܦܠܚܐ . ܗܘ ܒܢܝܢܐ ܡܫܝܚܐ . ܘܠܟܢܘܫܬܐ ܕܠܗܘܢ ܕܒܢܝܢܐ ܕܐܬܝܢ .

ܐܢܐ ܒܗܘܠܦܐ ܕܙܒܢܐ ܒܠܝܒܐ ܡܠܟܐ ܡܢ ܐܠܗܐ . ܗܘܐ ܡܫܡܫܐ ܠܗ ܐܢܫܘܬܐ ܡܠܟܐ . ܗܘܐ ܒܫ ٢٠٠ ܡܠܟ ܘܡܠܟ . ܡܫܡܫܐ ܡܠܟ ܘܡܠܟ . ܐܘܟܝܬ . ٢٠٠ ܠܗ ܒܢܝܢܐ ܡܠܟܐ . ܐܢܐ ܘܙܒܢܐ ܠܗ ܒܫܢܬܐ ܦܝܫ ܒܗ ١٢٠ ـ ٨٠ ܡܠܟ ܘܡܠܟ ܐܘܟܝܬ ٨٠ . ١٢٠ . ܡܛܠ ܐܦ ܒܫܢܝ ܠܐ ܝܠܕܬܐ ܕܙܒܢܐ ܠܗ ܒܫܢܬܐ ܠܗܘܢ . ܒܒܢܝܢܐ ܕܒܢܝܬܐ ܕܦܠܚܬܐ ܠܗ ܒܢܝܢܐ ܡܠܟܐ . ܘܒܢܝܢܐ ܒܠܒܐ ܠܒܢܝܬܐ ܕܝܘܡܐ ܒܗ ܒܫܢܬܐ ܘܒܢܝܢܐ ܡܠܟܐ ܘܠܒܢܘܬܐ ܕܡܕܝܢܬܐ ܒܫܢܬܐ ܘܒܢܝܢܐ ܠܒܢܝܬܐ ܦܠܚܐ ܗܘ . ܐܘܟܝܬ .

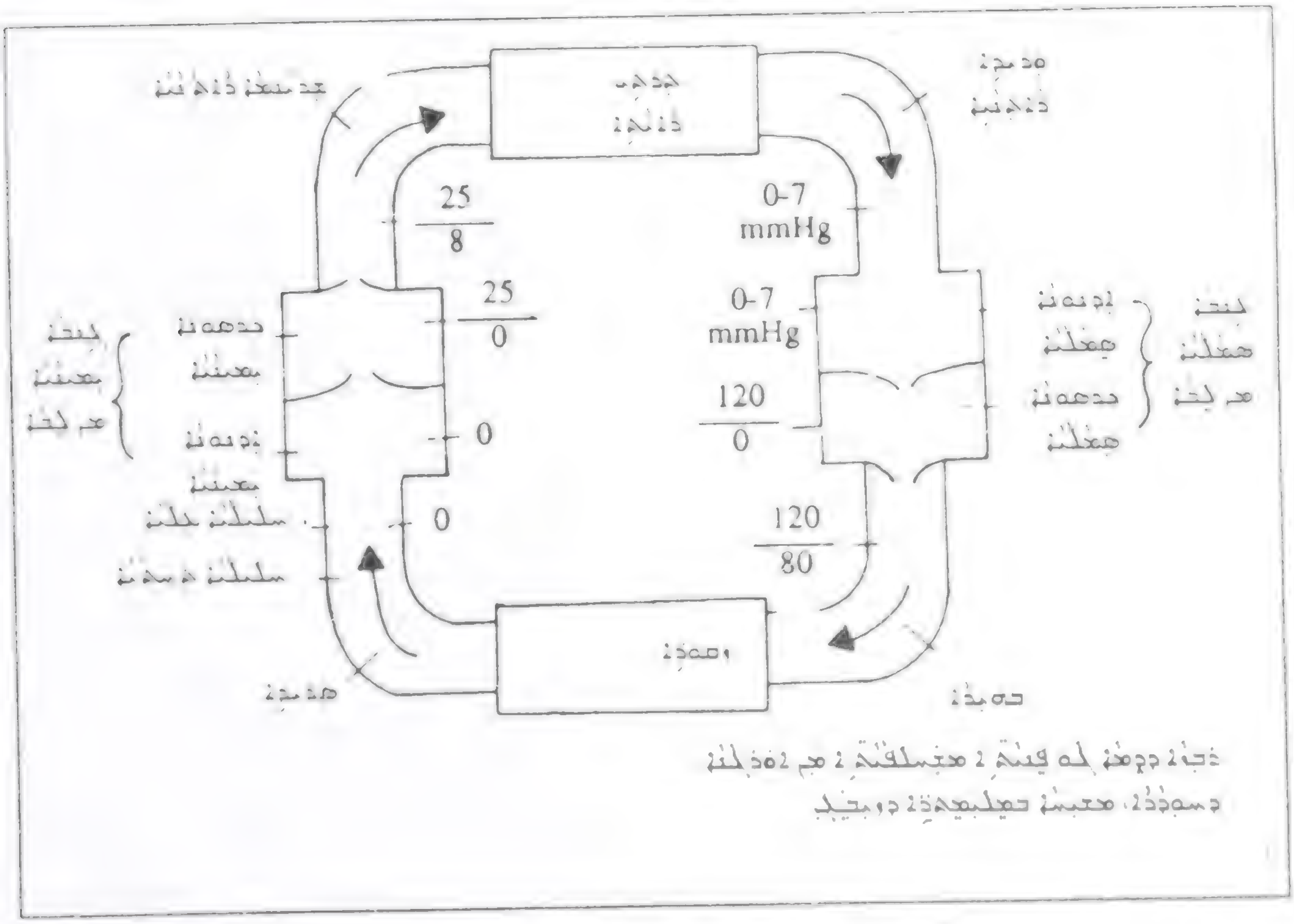
(٢٧ ـ ٢)

ܘܡܫܒܚܝܢ ܘܙܒܢܐ ܒܫܠܝܘܬܐ ܕܒܢܐ ܐܢܫܐ ܡܢ ܒܝܬ ܝܠܘܦܐ ܠܗ ܠܡܘܫܐ . ܕܒܠܐ ܕܒܫܘܬܐ ܕܟܡܐ . ܗܘ ܘܫܡܥ ܟܠ ܡܫܝܚܘܬܐ ܕܦܠܘܫܐ ܕܟܡܐ . ܘܟܠ ܡܫܝܚܐ ܕܐܦܠܚܐ ܕܟܡܐ ܡܫܝܚܐ . ܐܦ ܫܡܥ ܘܙܒܢܐ ܟܠ ܡܠܟܐ ܕܡܢܐ . ܒܢܝܢܐ ܘܠܗܐ ܡܫܝܚܐ ܒܢܝܢܐ ܒܐܢܫܘܬܐ ܐܢܫܐ . ܠܝܠܕܬܐ ܟܠ ܐܢܫܘܬܐ ܕܙܒܢܐ ܐܘܟܝܬ . ܟܠ ܕܐܝܬ ܡܫܒܚܝܢ ܠܗ ܒܢܝܢܐ . ܝܘܡܐ ܕܡܠܟܘܬܐ ܕܙܒܢܐ ܐܘܟܝܬ .



ܐܣܟܡܐ (٢ — ٢٧) ܡܚܘܘܝܬܐ ܠܬܪܥܐ ܕܠܒܐ

ܘܒܝܕ ܠܡܦܬܘܚܐ ܕܠܒܐ ܕܡܕܝܩ ܡܢ ܚܘܠܛܢܐ ܒܬܪܥܐ ܕܠܒܐ. ܠܐ ܦܘܡܐ ܡܚܘܠܛܢܐ ܡܢ ܐܘܪܚܬܐ ܕܚܘܪܬܐ. ܠܐ ܐܝܬ ܡܫܪܝܬܐ:



٦ — ٣ — ١ — ܡܫܢܝܢܘܬܐ ܕܐܘܟܣܓ݂ܝܢ (Oxygen Transport) :

ܟܠܢܫ ܡܬܚܠܠܘܬܐ ܕܢܘܦܫܐ ܝܠܗ ܕܡܐ ܥܠ ܐܝܕܐ ܬܫܡܫܬܐ ܕܬܢܝܢܐ . ܝܠܗ ܘܕܒܫܐ ܡܫܕܪܢܐ ܠܗܘܦܐ ܘܡܫܡܫܢܘܬܐ ܕܡܩܪܒܬܐ ܕܢܘܦܫܐ ܘܐܢ ܦܠܚܢܘܬܐ ܡܦܪܢܣܢܘܬܐ ܕܕܡܐ .

ܡܢܝܢܐ ܐܘܟܣܓ݂ܝܢ ܡܢ ܗܘܐ ܕܡܫܘܠܡܢܘܬܐ ܠܕܡܐ . ܘܦܪܫ ܡܢ ܠܗ ܣܠܩܐ ܕܐܣܦܪܘܓܐ ܡܫܡܫܢܘܬܐ ܕܕܡܐ . ܕܡܣܝܒ ܥܠ ܙܒܘܠܬܐ ܦܬܘܚܝܬܐ ܗܝܡܘܓܠܘܒܝܢ . ܡܬܚܙܝܐ ܐܘܟܣܝ ܗܝܡܘܓܠܘܒܝܢ (Oxy heamoglobin) . ܘܡܫܘܬܐ ܘܕܒܫܐ ܕܐܘܟܣܓ݂ܝܢ ܡܫܢܝܢܢܐ ܝܠܗ ܗܘܐ ܕܡܫܘܠܡܢܘܬܐ ܕܝܠܗ ١٠٠ ܡܠܝܐ ܘܝܬܒ . ܘܗܕܐ ܦܫܛܘܬܐ ܕܡܫܬܚܠܦܘܬܐ ܕܕܡܐ ܒܟܠܢܐ ܕܥܬܕܐ ܠܗ ܐܬܐ . ܡܢ ٧٠٪ ܠܥܕܟܐ ٩٥٪ . ܗܕܐ ܦܫܛܘܬܐ ܕܕܡܐ ܒܡܠܝܬܐ ܕܐܘܟܣܓ݂ܝܢ ܠܡܫܘܠܡܢܘܬܐ ܕܗܝܡܘܓܠܘܒܝܢ . ܡܬܦܪܫܬܐ ܡܢ ܦܪܘܛܝܢܐ ܕܓܠܘܒܝܢ ܐܝܟܐ ܥܡ ܐܪܒܥܐ ܡܘܠܟܐ ܡܢ (ܗܝܡ) . ܘܐܝܬܠܗ ܡܫܚܬܐ ܕܫܘܦܐ ܥܡ ܐܘܟܣܓ݂ܝܢ . ܡܛܠ ܣܡܟܐ ܥܠ ܦܪܙܠܐ ܒܡܛܟܣܘܬܐ ܕܦܪܙܠܐ (Fe^{+2}) .

ܘܠܗܝܬܐ ܕܫܘܦܐ ܒܝܢ ܦܪܕܬܐ ܕܦܪܙܠܐ ܘܐܘܟܣܓ݂ܝܢ . ܡܢ ܐܪܒܥܐ ܕܠܒܫܐ . ܕܝܠܗܘܢ ܝܠܗ ܥܠ ܘܕܒܫܐ ܡܢܝܢܐ ܠܐܘܟܣܓ݂ܝܢ . ܠܬܪܝܢܘܬ ܐܘܟܣܝܕܐ ܕܦܪܙܠܐ . ܘܥܠ ܕܐܗܐ ܒܫܘܠܛܢܐ ܦܝܫ ܡܬܦܪܫܐ ܠܗ ܬܪܬܝܢ ܐܢܫܐ . ܒܝܠܬܐ ܕܐܢܫܝܐ ܘܕܒܫܐ ܡܢܝܢܐ ܕܐܘܟܣܓ݂ܝܢ ܠܗ ܗܘܐ ܕܡܫܘܠܡܢܘܬܐ . ܘܦܝܫ ܥܒܝܕܐ ܠܗ ܘܫܘܦܐ . ܐܝܟܐ ܕܗܘܐ ܘܕܒܫܐ ܡܢܝܢܐ ܠܐܘܟܣܓ݂ܝܢ ܒܗܘܦܐ . ܘܠܬܪܝܢܘܬ ܐܘܟܣܝܕܐ ܕܦܪܙܠܐ . ܝܠܗ ܐܝܟ ܕܡܚܘܘܐ ܝܠܗ ܡܘܠܕܐ ܕܒܝܬܐ ܝܠܗ :

CO_2 ܡܗܘܬܐ ܒܗܘܦܐ ، O_2 ܡܚܘܬܐ ܝܠܝܬܐ

(ܐܪܥܐ ܕܐܢܫܐ) ܬܘܪܐ ، ܡܪܒܪܘܬܐ

$$Hb + 4\ O_2 \longrightarrow Hb(O_2)_4$$

٦ — ٣ — ٢ - ܡܫܘܚܠܦܘܬܐ ܕܛܥܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ.

Transport ... CO_2:

ܡܬܝܐ ܕܡܐ ܠܛܥܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ. ܡܢ ܚܡܘܪܐ ܠܛܪ̈ܦܐ ܪ̈ܝܫܝܐ ܠܪ̈ܦܝܢܘ ܠܒܪ ܦܓܪܐ. ܒܐܘܪܚܐ ܕܗܘܐ ܕܝܬܝܩܐ. ܘܐܝܟ ܛܥܝܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ. ܒܟܪܟܐ ܕܟܪ̈ܟܐ ܗ̇ܘ ܕܡܐ ܒܐܝܢܘܬܐ ܡܫܠܦܬܐ ܐܝܟ:

١ - ܡܫܪܝܐ ܕܘܫܒܐ ܫܝܢܐ ܐܘ ܚܠܐ ܕܕܡܐ ܘܦܠܓܘܬܗ ٥٪ ܡܘܬܪܐ.

٢ - ܡܚܒܪܐ ܥܡ ܦܪܘܬܝܢܐ ܕܕܡܐ ܕܐܝܟ ܐܘ ܗܝܡܘܓܠܘܒܝܢ ܘܦܠܓܘܬܗ ٣٠٪.

٣ - ܗ̇ܘ ܒܐܣܟܝܡܐ ܕܐܝܘܢܐ ܕܒܝܟܪܒܘܢܐܛ HCO_3 ܘܦܠܓܘܬܗ ٦٥٪. ܒܟܪ̈ܟܐ ܕܟܪ̈ܟܐ ܕܕܡܐ ܐܘ ܚܡܘܪܐ. ܥܒܪ CO_2 ܠܕܡܐ ܟܕ ܢܦܩ ܐܘ ܡܢ ܡܬܬܝܢܐ ܕܕܡܐ. ܥܒܪ ܗܟܢ ܥܒܪ ܠܦܪ̈ܝܢܐ ܡܡܘܡܝܐ. ܘܐܝܟ ܡܚܝܕ ܥܡ ܡܝܐ ܒܐܠܦܐ ܡܡܘܙܓܢܐ ܥܡ ܡܝܐ. ܡܢ ܗܢܐ ܐܘ ܦܠܓܐ ܘܦܠܓܐ ܐܘ ܐܢܙܝܡܐ ܕܐܢܗܝܕܪܐܙ ܟܪܒܘܢܝܟ ܐܢܗܝܕܪܐܙ (CA) ܡܫܪܥܢܐ ܚܡܘܨܐ ܕܟܪܒܘܢܝܟ. ܗܘ ܕܡܬܦܪܫ ܥܡ ܠ H^+ . HCO_3 ܐܝܟ ܒܡܘܫܚܬܐ ܕܐܬܝܐ ܗܢܐ:

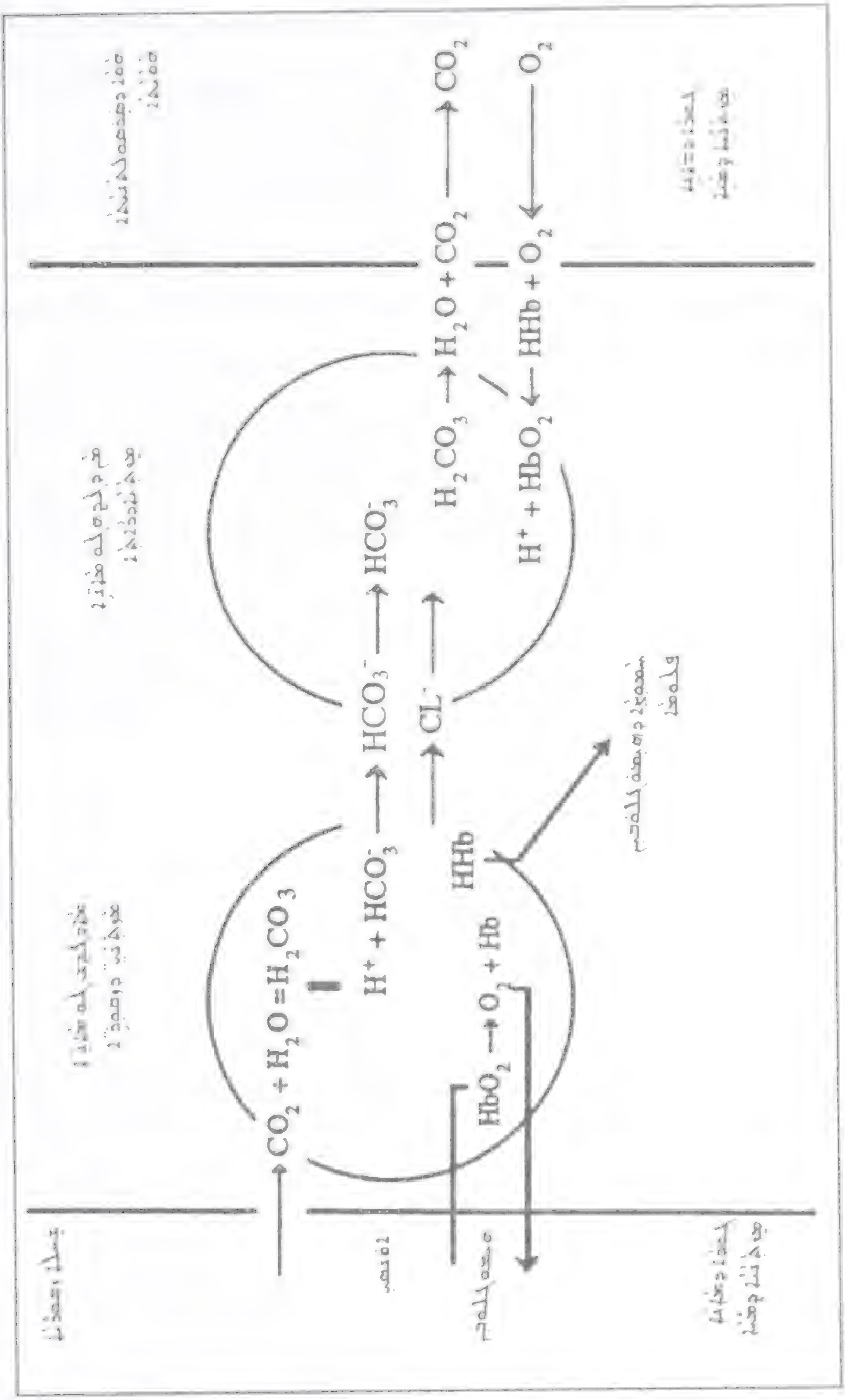
ܐܢܙܝܡܐ CA

$$CO_2 + H_2O \longrightarrow H_2CO_3$$

ܚܡܘܨܐ ܕܟܪܒܘܢܝܟ

$$H_2CO_3 \longrightarrow H^+ + HCO_3^-$$

ܦܬܚ ܡܟܝܠ ܐܘܡܢܐ ܕܘܝܕܘܠܝܢ ܒܡܦܪܢܣܘܬܐ ܕܢܨܠܐ ܠܕܟܬܐ ܕܘܝܡܘܠܠܘܬܝܢ ، ܟܕ ܡܬܕܘܪܐ ܚܕ ܚܡܘܪܐ (IIIIb) . ܐܝܟܐ ܕܬܘܬܐ ܕܐܘܡܢܐ ܕܡܟܬܒܢܘܬܐ ، ܟܬܒ ܡܢ ܗܘ ܐܣܛܦܘܢܐ ܡܫܡܫܢܐ ܠܦܠܘܣ . ܘܬܒ ܒܕܘܟܬܐ ܗܝ ܐܘܡܢܐ ܕܠܘܬܒܕ (1) . ܠܢܛܪܬܐ ܟܠ ܡܫܠܡܘܬܐ ܕܐܘܫܢܐ . ܗܘ ܐܣܛܦܘܢܐ ܡܫܡܫܢܐ . ܘܒܝܪܬܐ ܕܡܛܪܬܐ ܕܕܫܢܐ ܠܡܬܪܗ ܬܢܝܐ . ܒܣܠܩ ܢܣܩܘܬܐ ܒܡܫܡܫܐ ܒܬܪܝܢܐ . ܘܦܬܟܠܝܬ ܘܬܟܐ ܡܢ ܐܘܢܬܢܐ ܠܗܘܦܐ ܢܒܝܬܘܬܢܐ ܘܗܦܟ ܦܟܠܝܘܬܐ ܡܕܡܫܡܬܐ . ܗܘ ܟܕ ܐܝܢܫܐ ܕܠܟܝ . ܠܗ ܕܟܬܒܬܐ ܕܡܟܬܒܢܘܬܐ ܠܠܗ ܐܣܛܦܘܢܐ ܡܫܡܫܢܐ ܕܕܫܢܐ . ܘܡܚܝܕܬܗ ܒܐܘܢܐ ܕܘܝܕܘܠܝܢ . ܘܡܬܕܪܒ ܚܡܘܪܐ ܕܡܬܟܬܒܝܢ . ܗܘ ܕܟܬܒܐ ܠܡܬܪܗ ܐܘܡܢܝܬܐ ܕܡܬܟܬܒ . ܘܡܫܢܐ . ܘܦܬܚ ܡܬܢܝܬܗ ܐܘܡܢܝܬܐ ܕܡܬܟܬܒ . ܠܦܠܘܫܐ ܕܕܫܢܐ . ܘܡܢ ܕܫܢܐ ܠܗܘܐ ܕܡܫܡܫܢܐ . ܘܦܬܟ ܡܬܘܦܐ ܟܠ ܗܘܐ ܕܢܟܬܒ . ܐܝܟ ܕܡܘܟܝܬܐ ܟܠܗ ܠܗ ܐܘܗ ܡܫܒܚܬܐ :



ܡܫܪܛܐ ܡܚܘܝܢܐ ܠܚܘܠܦܐ ܕܐܟܣܝܓܢ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ، ܠܦܠܓܡܐ
ܕܕܡܐ ܘܫܢܝܘ ܠܗܘܐ ܕܫܪܫܘܠܝܘܬܐ ܐܝܟܐ ܕܡܬܚ ܡܪܘܩܐ ܠܟܪܒܐ.

ܦܘܼܠܵܚܹ̈ܐ ܕܦܘܼܫܵܩܵܐ ܠܐܦܹ̈ܐ (ܡܫܘܿܚܠܦܘܼܬܵܐ)

١. ܡܢܘ ܠܐܦܝܵܐ ܕܡܫܘܿܚܠܦܘܼܬܵܐ ܠܹܗ ܢܚܵܫܵܐ ܘܡܢܘܿܕܠܹܗ ܒܚܕܵܢܘܼܬܵܐ.

٢. ܡܢܘܿܢ ܒܚܕܵܢܘܼܬܵܐ ܠܐܵܘܵܪܵܐ ܐܝܼܢܵܐ ܕܡܦܩܵܐ ܠܫܘܼܠܛܵܢܵܐ ܕܡܢܵܐ ܘܡܠܝܼܐ ܠܒܠܐ ܠܹܗ ܢܚܵܫܵܐ ܡܢܵܢܵܐ.

٣. ܡܢܝܼܢ ܐܦܝܹ̈ܐ ܕܡܠܘܐܐ ܐܝܼܢܵܐ ܕܡܫܬܒܠܐܘ. ܒܗܕܵܢܵܐ. ܘܐܢܝܼܢ ܦܫܝܼܛ ܡܢܘܿܚܵܐ.

٤. ܡܢܘ ܟܠ ܦܘܼܩܕܵܢܵܐ ܠܦܝܼܫܬܵܐ ܕܦܸܬܵܐ ܡܦܫܛܵܐ ܠܗ̇ܘܼ ܗܘܼܕܥܵܢܵܐ ܠܗ ܢܚܝܼܬܵܐ.

٥. ܡܦܘܼܫ ܒܡܦܫܛܵܢܹ̈ܐ ܠܐܵܘܵܪܵܐ ܐܝܼܢܵܐ ܕܡܦܩܵܐ ܠܦܫܝܼܛܘܼܬܵܐ ܕܡܫܘܿܚܠܦܘܼܬܵܐ ܠܗ ܒܗܕܵܢܵܐ.

٦. ܡܢܝܼܢ ܡܢܵܐ ܕܒܐܬܵܬܹ̈ܐ ܡܢܵܐ:

ܐܵܘܵܪܵܐ ܦܠܛܵܢܵܐ. ܕܠܐ ܫܘܼܬܵܦܵܐ ܡܘܬܒܵܬܵܐ. ܐܵܘܵܪܵܐ ܒܟܪܟܘܼܬܵܐ. ܡܢܝܵܢܵܐ ܡܫܚܵܐ. ܠܡܦܩ. ܫܡܫܵܐ ܐܢܫܹ̈ܐ. ܡܦܪܬܵܐ ܒܣܡܵܐ ܐܦܘܿܬܵܐ. ܐܵܘ ܠܟܐ ܐܝܟܢܵܐ ܒܟܦܢܐ ܠܗ ܒܐܢܟܐ: ܐܒܠܐ ܕܦܘܼܪܫܵܢܵܐ.

٧. ܡܫܘܼܐ ܠܫܠܝܼܬܵܐ ܕܡܢܵܐ ܕܒܐܬܵܬܹ̈ܐ ܡܢܵܐ:

ܐ. ܐܢ ܠܗ ܡܘܢܵܬܵܐ ܣܬܝܼܪܬܵܐ ܕܫܘܼܬܵܦܵܐ ܡܘܬܒܵܬܵܐ ܡܢܵܐ ܐܢܫܘܼܬܵܐ ܠܒܘܼܪܟܵܬܵܐ ܒܫܠܡܘܼܬܵܐ ܕܒܝܼܬܵܐ ܠܒܠܐ.

ܒ. ܒܟܪܝܬܵܐ ܕܒܘܼܚܵܢܵܐ ܠܒܠܐ ܕܦܝܼܫܬܵܐ. ܗ̇ܘ ܕܦܬܵܚ ܡܚܝܵܐ ܡܢܗ ܘܡܘܕܥ ܟܪܝܵܐ. ܘܡܦܫܛ ܒܗܕܵܢܵܐ ܠܗ ܟܠܐ ܡܦܫܛ ܒܘܡܕܵܐ.

ܓ. ܗܠܐ ܐܦܝܬܵܐ ܕܡܠܘܐܐ ܦܠܝܼܓܵܐ ܡܢ ܦܫܝܼܛܘܼܬܵܐ ܒܕܝܼܬܵܐ ܒܝܢ ܐܘܼܡܬܵܐ ܘܡܠܘܐܐ ܐܢܫܹ̈ܐ ܕܦܠܚ ܟܠܗ.

ܕ. ܐܟܝܼܬܵܐ ܕܡܫܘܿܚܠܦܘܼܬܵܐ ܠܗ ܒܟܪܝܬܵܐ ܘܡܗܕܵܐ ܒܝܘܡܵܬܵܐ ܠܗ̇ܝܟܵܐ ܐܦ ܕܗܘܼܡܬܵܐ ܕܐܢܫܘܼܬܵܐ ܡܢܵܬܵܐ ܡܦܫܛܵܐ ܒܗܕܵܐ.

ܗ. ܐܦܫܛܬܵܐ ܘܡܕܡܬܵܐ ܕܡܢܵܐ ܡܘܬܒܵܐ ܣܓܝ ܒܦܫܝܼܛܘܼܬܵܐ.

ܘ. ܡܢܘ ܡܢܵܐ ܕܡܢܵܐ ܣܘܼܓܵܐ ܠܗ ܡܘܠܟܵܬܵܐ ܕܐܒܠܐ ܒܕܘܼܟܵܐ ܕܠܒܠܐ ܠܗ ܢܝܫܵܐ ܐܚܪܵܢܵܐ.

٦ . ܦܝܫ ܡܚܘܝܢܐ ܐܘܪܚܐ ܕܕܡܐ ܠܗ ܦܣܪܘܢܝܐ ܚܕܡܐ ܠܗܘ . ܒܫܡܐ ܕܐܘܪܚܐ ܠܒܐ ܡܪܝܐ .

٧ . ܠܐ ܡܝܡܢܘܬܐ ܡܠܘ ܕܡܚܝܕ ܡܪܝܐ ܕܕܡܐ .

٨ . ܡܢܝ ܫܪܝܐ ܕܕܡܐ ܘܡܢܘܪ ܚܕܪܢܘܬܐ ܠܟܪܣܗ ܚܡܫܟܠܝܘܬܐ ܕܗܘܦܐ ܢܦܫܘܬܢܝܐ .

٩ . ܡܢܝܢ ܠܫܪܝܬܐ ܕܦܪܘܬܝܢܐ ܕܕܡܐ .

١٠ . ܠܡܢܐ ܒܥܣܐ ܗܫܘܪܘܬܐ ܕܡܚܟܠܝܘܬܐ ܕܠܒܐ . ܐܝܢܐ ܫܘܠܝ ܗܫܘܪܘܬܐ ܕܡܚܟܠܝܘܬܐ ܕܚܘܡܢܪܝܬܐ ܙܒܢܝܢܬܐ ؟

١١ . ܫܠܡܝ ܡܣܝܡܬܐ ܕܠܒܐ ܠܣܘܦܝܐ ܕܗܘܪܝܐ ܕܡܢܝܢ ܠܗܘܡܢܐ ܚܘܡܢܪܬܢܝܐ . ܕܪܘܫ ܠܝܠܬܐ ܫܒܝ :

ܐ . ܦܘܪܫܢܐ ܕܚܘܡܢܪܬܐ ܕܠܒܐ .

ܒ . ܡܝܢܪܐ ܘܪܓܠܐ ܕܠܒܐ ܚܡܫܟܠܝܘܬܐ ܕܠܗܘܐ ܣܘܦܝܐ .

ܓ . ܪܘܫܡܐ ܚܘܢܝܢܐ ܠܗܘܐ ܣܘܦܝܐ .

١٢ . ܡܢܝܢ ܠܘܪܕܝܐ ܕܕܡܐ ܘܡܢܝܢ ܠܠܡܘܬܐ ܫܪ ܐܢܫܝܢܐ ܡܢܚܕܝܢܐ ܒܗ .

١٣ . ܡܢܘܪ ܚܕܪܢܘܬܐ ܠܫܘܚܠܦܐ ܕܘܪܕܝܐ ܕܕܡܐ ܚܕܒܟܐ ܗܡܠܬܐ ܡܢ ܠܒܐ ܘܡܪܝܐ ܪܫܝܐ ܐܗܒܪܐ ܒܗ .

١٤ . ܪܫܘܡ ܚܕ ܡܚܪܬܐ ܫܪ ܡܢܘܪܐ ܠܪܡܘܬܐ ܕܫܘܢܝܐ ܕܚܪܢܘܬܐ ܐܘܚܒܪܐ ܕܡܪܟܗ ، ܡܢ ܘܣܘܪܐ ܠܕܡܐ . ܘܡܢ ܕܡܐ ܠܗܘܐ ܕܡܪܗܘܠܕܘܢܬܐ

ܚܠܘܦ :

ܕܡܐ ܐܝܬܠܗ ܐܪܒܥܐ ܚܠܩܐ A . B . AB . O ܘܗܘܠܐ ܚܠܩܘܢ ܚܪܫܬܐ ܕܦܠܓܘܬܐ ܕܕܡܘܢ ܠܐܢܫܘܬܐ ܚܕܪܢܐ ܕܚܠܩܘܢ ܠܫܒ ܕܪܫܐ ܐܠܗܐ ܠܐ ܫܒܒ .

ܚܕܪܢܐ ܕܘܦܩܐ ܗܠܐ ܕܗܘܐ ܕܕܡܘܢ ܚܫܝܢܐ ܠܕܡܐ ܕܚܒܪܐ .

ܠܡܢܐ ؟ ܙܒܝܢ ܚܙܘܐ ܙܒܢܬܐ .

ܦܘܠܚܢܐ ܕܚܝܐ

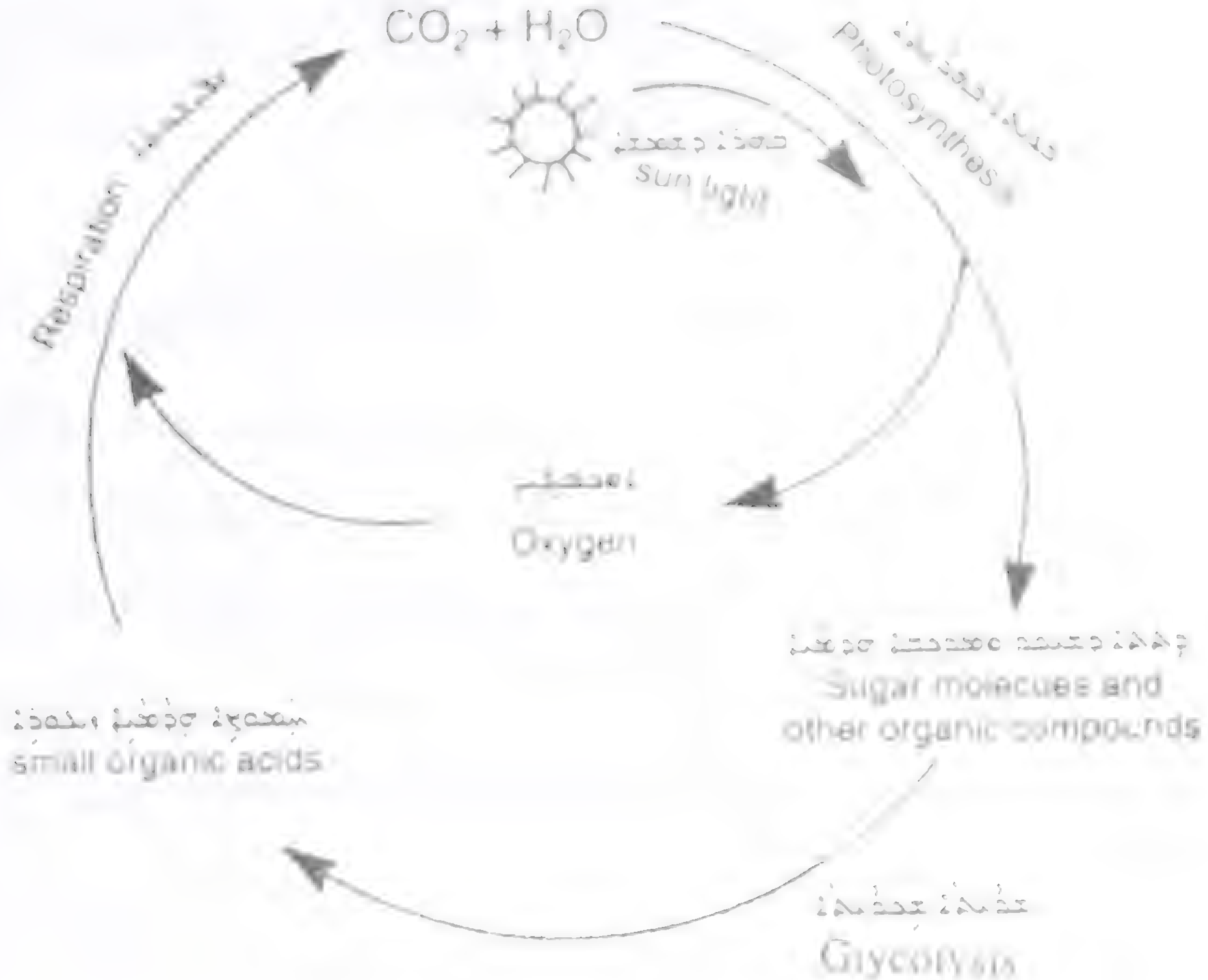
(ܢܫܡܬܐ)

ܐ. ܢܫܡܬܐ ܬܐܪܢܝܬܐ :

ܡܘܫܝܠܐܝܬ، ܢܫܘܒܐ ܡܫܬܡܠܝܐ ܡܢ ܫܘܚܠܦܐ ܕܚܘܠܦܐ ܥܠ ܐܪܥܐ. ܚܕܐ ܡܢܝܢܐ ܥܠ ܡܘܬܒܐ ܕܐܣܟܡܐ ܡܫܬܠܛܐ ܡܢ ܥܒܝܕܘܬܐ ܦܪܝܫܬܐ ܠܢܫܠܡܐ ܕܡܢܬܘܢܝܐ ܠܐ ܗܕܡܝܐ ܠܐܘܪܓܢܐ ܗܕܡܝܐ. ܘܐܢܐ ܚܕܐ ܝܠܗ ܢܫܡܐ ܡܬܪܟܢܘܬܐ. ܐܘܟܝܬ ܡܬܪܐ ܠܗܘܪܟܝܢܗ ܒܫܡܗ. ܘܠܐܡܬܪܟܗ ܐܝܟ ܐܢܫܘܬܐ ܠܡܐܟܠ ܕܝܠܗ. ܟܕ ܐܝܬ ܠܗܘܢ، ܡܢܝܢܐ ܠܡܦܩܐ ܕܥܒܝܕܘܬܐ ܒܗܕܡܐ ܡܢ ܥܡܪܐ. ܒܒܢܝܢܐ ܕܐܘܪܓܢܐ ܗܕܡܝܐ ܡܢ ܡܢܬܘܢܝܐ ܕܡܬܢܝܢ ܐܘܟܣܝܓܢ ܕܐܪܥܐ، ܘܡܝܐ. ܐܝܟ ܕܐܝܬ ܠܗ ܚܝܘܬܐ.

ܘܠܗ ܡܬܩܪܝܐ ܕܒܢܝܐ ܒܗܕܐ ܒܪܝ ܡܢܬܘܢܝܐ ܗܕܡܝܐ. ܘܡܢܝܢܗ ܡܢܬܘܢܝܐ ܕܒܪܝܐ. ܐܝܟ ܕܡܬܝܪ ܡܢ ܒܪܐ ܠܗܘܪܟܝܢܗ ܕܒܫܠܡ (ܢܫܠܡ ܒܗܕܡܐ). ܒܟܠܗ ܚܕܐ ܢܫܡܐ ܘܠܐ ܢܫܡܐ ܡܬܪܟܢܘܬܐ. ܘܗܕܐ ܡܛܠ ܐܝܬܐ ܚܕܐ ܕܡܘܕܥ ܒܥܒܝܕܘܬܐ ܘܡܫܬܚܠܦܢܘܬܐ ܒܒܢܝܢܐ ܐܢܫܝܐ ܠܦܪܨܘܦܗ. ܘܥܠ ܕܐܗܐ ܡܬܘܩܐ ܠܗ ܒܒܢܐ ܒܗܕܐ ܠܦܘܪܐ ܕܚܕ ܐܣܟܡܐ ܐܚܪܢܐ ܡܢ ܫܘܚܠܦ ܚܝܐ ܕܥܒܝܕܘܬܐ.

ܘܠܗ ܢܫܡܬܐ ܬܐܪܢܝܬܐ (Cellular respiration) . ܦܝܫ ܡܬܦܠܓܐ ܐܘܟܝܬ ܗܕܝܐ ܐܝܟ ܦܠܓܐ ܒܪܝܫܐ ܡܢ ܒܢܝܐ ܒܗܕܐ. ܠܫܘܠܡܐ ܕܥܒܝܕܘܬܐ ܦܫܛܐ ܠܗ ܫܡܘܪܐ ܗܕܝܐ ܒܡܬܩܪܝܐ ܕܟܪܟܐ ܫܟܝܢܐ. ܕܐܣܟܡܐ ܕܗܘܢܐ ܡܢܝܢܐ ܡܦܠܓܗ. ܘܦܠܓܗ ܗܪܟܢܘܬܐ ܐܘܟܣܝܓܢ ܕܐܪܥܐ، ܐܝܟ ܦܠܓܐ ܐܚܪܢܐ. ܘܡܬܩܪܝܐ ܢܫܡܬܐ ܬܐܪܢܝܬܐ ܠܡܫܠܡܘܬܐ ܕܟܝܢܐ ܪܒܐ ܠܐܘܪܓܢܐ ܕܟܠܗ. ܪܒܝ ܠܗܘ ܢܛܪܐ ܕܐܪܥܐ، ܕܢܫܡܬܐ. ܡܢ ܠܗ ܐܣܟܡܐ ܕܚܝܘܬܐ ܕܐܝܟ ܥܠ ܐܪܥܐ. ܐܝܟ ܕܡܘܒܠܐ ܝܠܗ ܠܗ ܕܐܗܐ ܡܬܪܟܢܐ :



ܥܘܡܪܐ ܕܐܝܟ ܠܡܦܩܬܐ ܕܡܪܟܒܐ: ܦܬܐ ܡܘܦܠܚܬܐ ܠܢܘܗܪܐ ܒܢܝܢܐ ܡܢ ܥܦܪܐ ܒܥܠܡܬܐ ܕܡܢܬܘܢܝܬܐ ܕܗܝܕܪܘܓܢ ܐܘܟܣܝܓܢܐ ܕܡܪܟܒܘ. ܘܥܠܐ ܒܡܬܘܡܬܐ ܕܒܢܝܐ ܒܢܝܢܐ ܠܡܦܩܬܐ ܐܘܪܓܢܐ ܐܝܟ ܡܢܬܘܢܝܬܐ ܕܟܪܒܐ. ܐܝܟ ܦܬܐ ܥܡܠܬܐ ܒܡܬܘܡܬܐ ܕܥܒܕܐ ܥܒܕܐ ܠܢܘܗܪܐ. ܐܝܟ ܕܦܥܠܘ ܢܦܩܬܐ ܒܡܢܬܘܢܝܬܐ ܕܟܪܒܐ. ܒܟܪܟܐ ܕܒܢܝܐ ܒܢܝܢܐ. ܘܒܟܪܟܐ ܕܦܠܘܓܐ ܕܡܢܝܐ ܠܡܢܬܘܢܝܬܐ ܕܚܕ ܚܡܘܨܐ ܐܘܪܓܢܐ ܙܥܘܪܐ. ܘܠܘ ܡܬܘܡܬܐ ܕܢܦܫܘܬܐ. ܦܬܐ ܥܡܠܬܐ ܠܢܘܗܪܐ ܗܝ ܕܦܥܠܐ ܥܠܘ ܠܘ ܚܡܘܨܐ ܐܘܪܓܢܐ. ܒܡܘܬܐ ܕܐܘܟܣܝܓܢ ܥܒܝܕܐ ܐܝܟ ܦܠܓܐ ܥܒܝܕܐ. ܠܘ ܒܢܝܐ ܒܢܝܢܐ.

٢. **ܡܬܟܫܘܬܐ ܕܢܦܫܘܬܐ:**

ܡܕܡ ܒܗܘ ܢܦܫܘܬܐ ܐܝܬܘ ܠܡܢܝܢܐ ܠܘ ܡܬܟܢܫܐ ܕܡܬܟܫܘܬܐ ܦܣܘܠܘܬܐ. ܥܒܝܕܐ ܦܥܠܘ ܢܦܩܬܐ ܡܢ ܙܒܢܐ ܠܙܒܢܐ. ܕܙܘܥܐ ܕܐܪܥܐ ܐܝܬܝܗ ܥܠܘ ܠܣܘܟܐ. ܘܐܦ ܟܠܐ ܙܘܥܐ ܕܐܪܥܐ ܒܡܕܡ ܒܙܒܢܐ. ܐܝܟ ܡܬܪܡܝܐ ܕܒܪܝܬܐ ܕܢܦܫܘܬܐ ܠܐ ܡܬܘܬܠܘ ܐܠܐ ܒܥܕܢܐ ܕܡܬܟܫܐ ܒܗ ܢܦܫܐ ܕܟܠܗ ܙܘܥܐ ܐܝܟ ܠܝܠܝܐ ܘܒܝܡܡܐ ܒܥܠ ܘܒܥܡܠܐ ܗܘܝ

ܡܢ ܒܬܪ ܙܒܢܐ ܕܐܘܪܫܠܡ. ܘܒܪ ܡܘܬܒܠܗ ܒܗܝܠ ܚܕ ܦܘܪܫܐ ܠܗܠܝܢ
ܠܗ ܚܕ ܡܕܝܢܬܐ ܕܒܝܬܐ ܘܕܝܪܝܠܗ، ܘܡܘܬܒܠܗ ܚܕ ܟܘܡܪܐ ܠܗ ܚܕ ܡܕܝܢܬܐ
ܕܒܝܬܐ. ܘܡܫܡܠܗ ܒܘܪܢܝܐ ܕܡܘܪܢܐ ܕܟܪܝܣܛܝܢܘܬܐ ܕܟܪܝܐ ܕܦܘܪܫܐ.
ܘܒܪܠܗ ܒܗܝܠ ܕܗܘܐ ܐܢܫܐ ܝܠܗ ܠܫܢܐ. ܐܝܟ ܕܝܠܗ ܐܢܫܐ
ܠܫܢܐ ܕܦܘܪܫܐ. ܘܒܗܕܐ ܗܘ ܒܝܠܗ ܠܫܢܐ ܕܦܘܪܫܐ ܒܡܠܘܐܐ
ܣܘܪܝܝܐ ܗܕܡܝܐ. ܘܐܢܫܘܬܐ ܕܗܘܐ ܠܫܢܐ ܡܫܘܚܐ ܝܠܗ ܡܢ
ܒܘܠܠܐ ܢܫܪܐ ܒܦܫܛܘܬܐ ܕܒܠܝ ܗܟܐ. ܐܝܬܐ ܠܐ ܗܘܐ ܒܐܝܟ ܗܕܒܐ
ܢܘܪܘܬܐ ܒܗܝ ܝܕܥܐ. ܘܒܪ ܣܝܒܠܗ، ܣܕܡܐ ܐܢܫܐ. ܕܘܡܟܐ ܕܝܕܥܐ
ܐܦܢܐ ܝܠܗ ܠܫܢܐ. ܐܝܬܐ، ܕܘܒܪܐ ܗܘܐ، ܣܘܐܠܗ ܫܢܬܐ ١٦٦٧ ܣܒ
ܝܫܘܥ ܠܦܘܢܝܐ ܟܠ ܕܐܗܐ ܣܘܫܒܐ. ܘܒܪ ܦܪܡܠܗ ܐܠܗܐ ܕܣܒ ܒܠܟܐ
ܘܣܠܗ. ܗܘ ܝܠܗ ܡܠܘܦܘܬܐ ܕܡܠܟܐ ܠܦܘܡܐ ܕܝܕܥܐ. ܘܡܟܪܝܐ
ܟܪܐܝܬ ܡܫܘܚܐ ܕܣܘܐ ܐܝܬܐ ܡܘܫܝܠܗ ܠܗܘܐ. ܕܡܫܝܚܐ ܝܠܗ
ܬܪܝܢܐ ܕܐܝܟ ܐܗܐ ܣܘܐ ܫܢܐ ٠٢. ܦܫܠܗ ܢܫܐ ܗܘܐ ܠܗ ܟܪܝܐ
ܪܐܬܗ. ܗܘ ܗܕܒܐ ܡܠܘܣܘܐܠܗ ܕܣܘܐ ܡܫܕܐ ܟܠ ܗܘܐ ܕܟܬܒܐ
ܠܟܪܝܐ ܪܐܬܐ.

ܐܝܬܐ، ܪܒܪܒ ܠܦܘܪܒ. ܗܘ ܝܠܗ ܢܒܘܟܐ ܦܠܘܠܘܓܝܐ ܐܣܪܢܐ ܡܢ
ܐܘܪܫܠܡ. ܡܒܠܠܗ ܒܡܫܢܝܐ ܡܢ ܢܘܫܒܐ. ܒܪ ܗܘ ܡܦܘܓܝܐ ܠܟܪܝܬܐ
ܕܠܓܐ ܕܢܦܫܘܬܐ. ܘܣܘܐܠܗ ܕܡܟܐ ܕܦܪܝܒܐ ܐܟܘܡܐ ܦܝܫ ܡܘܫܐ ܡܢ
ܡܟܬܒܘܬܐ ܕܟܬܒܪܗ ܠܗ ܟܪܝܐ ܪܐܬܐ. ܘܒܪܠܗ ܕܐܗܐ ܠܘܢܐ
ܡܡܘܡܐ ܪܒܪ ܠܡܢܦܘܩܬܐ ܕܗܘܐ. ܐܝܟ ܕܟܬܒܪ ܠܕܡܐ.

ܒܫܠܗ (ܝܘܣܦ ܒܪܫܡܥܘܢ) ١٧٣٣-١٨٠٤ ܐܘܪܫܠܡ، ܐܝܬܐ ܢܒܘܟܐ
ܦܪܢܫܐ ܐܢܫܐ. ܠܐܒܘܢ ١٧٤٣-١٧٤٩ ܗܘ ܝܠܗ ܕܡܘܒܝܠܗ
ܠܐܢܫܘܬܗ ܠܗ ܢܦܫܘܬܐ. ܒܪ ܡܘܒܪܐܠܗ ܠܦܘܡܐ ܡܝܢܐ ܡܢ ܢܘܫܒܐ.
ܕܐܘܪܫܠܡ ܦܝܫ ܠܡܒܝܐ ܡܢ ܗܘܐ ܟܬܘܒܐ ܠܟܪܝܐ ܪܐܬܐ. ܘܟܬܒ ܡܢ ܠܗ
ܘܡܘܪܝܗ ܠܝܗ ܡܫܘܐܠܐ ܕܡܢܐ. ܘܐܦ ܡܘܒܪܐܠܗ ܟܪܝܐ ܗܘܐ ܐܘܪܫܒܪܐ
ܕܟܪܝܗ، ܦܠܝܛ ܡܢ ܟܪܝܐ ܪܐܬܐ ܗܘ ܒܗܝ ܝܕܥܐ. ܘܣܝܒܠܗ ܠܐܒܘܢ

ܕܢܟܦܘܬܐ ܕܐܝܬܝܗ̇ ܚܕܐ ܝܠܗ̇ ܐܝܟ ܡܦܪܫܬܐ ܕܩܘܒܠܐ . ܟܕ ܟܬܒܝ ܡܠܘܐܘܬܐ ܫܒܝܒ ܠܚܘܒܐ ܥܡ ܐܚܪ̈ܢܐ .

٣ - ܢܟܦܘܬܐ ܘܡܟܝܟܘܬܐ :

ܐܡܪܠܗ ܠܐܒܘܗܝ ܟܡ ܢܟܦܘܬܐ ܕܚܢܐ ܘܡܟܝܟܘܬܐ ܕܩܘܒܠܐ . ܡܛܠ ܟܬܒܝ ܒܟܠܐ ܫܒܝܒ ܠܚܘܒܐ ܥܡ ܐܚܪ̈ܢܐ . ܘܒܥܒܕܘܬܐ ܡܟܝܟܘܬܐ ܠܟܠܡܐ ܠܐ ܚܢܐ . ܝܠܗ ܚܕܐ ܒܟܠܐ ܡܕܘܡܝܐ ܡܠܝܬܐ ܠܢܟܦܘܬܐ . ܘܬܘܟܠܢܐ ܕܟܠ ܡܟܝܟܐ ܠܗ ܒܥܘܢܐ ܠܐ ܝܠܗ ܐܡܪܝܬܐ ܐܠܐ ܡܢܐ ܐܘ ܟܡܐ ܐܘ ܐܝܟܐ ܐܘ ܗܘܦܐ . ܘܐܢܐ ܕܠܝܗ ܡܠܘܐܐ ܝܠܝܗ ܗܕܡܐ ܫܒܝܒ ܠܛܝܒܘܬܐ ܥܡܠܢܝܬܐ ܡܦܫܬܐ . ܘܡܟܝܟܬܐ ܝܠܗ ܥܒܕܬܐ ܚܢܬܐ ܠܢܟܦܘܬܐ . ܕܗܝ ܝܠܗ ܡܟܝܟܘܬܐ . ܐܝܢܐ ܐܦ ܗܝ ܟܕܝܫܬܐ ܝܠܗ . ܠܡܐ ܠܐ ܡܟܕܢܐ ܢܟܦܘܬܐ ܚܕܐ ܫܡܫܘܬܐ ܝܠܬܐ ܐܝܟ ܢܟܕܐ .

ܐܝܟ ܡܐ ܟܬܒܝ ܫܠܝܚܐ :

ܡܟܝܟܬܐ : ܢܟܕܐ ܝܠܗ ܡܟܝܟܘܬܐ ܠܐ ܒܥܒܝܕܐ . ܒܫܘܒܚܐ . ܕܚܠܝܗ ܐܡܪܐ ܐܝܢ ܕܝܠܝܗ ܠܗ ܡܬܟܪܝܬܐ ܕܬܘܟܠܢܐ ܕܦܬܐ ܒܚܕܐ ܝܟܬܐ . ܗܝ ܡܟܕܢܐ ܠܦܠܚܬܐ ܕܬܘܡܬܐ ܡܟܬܐ ܡܢ ܬܘܡܦܐ . ܒܗܝ ܝܟܬܐ . ܘܐܗܐ ܡܟܠܕܐ ܫܡܫܘܬܐ ܠܗ ܢܟܕܐ . ܐܝܢܐ ܢܟܦܘܬܐ ܗܝ ܝܠܗ ܡܟܝܟܘܬܐ ܡܠܝܬܐ . ܟܕܢܐ ܬܘܡܦܐ ܒܢܗ . ܡܢ ܟܠ ܐܢܫܐ ܒܢܬܗ ܢܡܘܦܬܐ . ܘܐܦ ܒܕܐܠܗ ܢܟܦܘܬܐ ܕܚܕ ܬܘܟܠܢܐ ܒܐܡܡܬܐ ܠܡܒܕܐ . ܒܘܢܝܐ ܕܬܘܡܦܐ ܦܠܝܛܐ ܗܘܐ ܥܘܢܐ ܐܠܗ . ܐ. ܦܝܫ ܡܟܝܟܐ ܐܗܐ ܬܘܟܠܢܐ ܠܗ ܒܥܘܢܐ . ܐܝܢܐ ܬܘܡܦܐ ܠܗ ܡܠܘܐܘܬܐ ܕܢܟܦܘܬܐ ܦܝܫ ܥܡܠܐ ܢܫܐ ܒܢܫܐ . ܘܟܠ ܕܐܗܐ ܦܬܐ ܫܡܫܘܬܐ ܒܘܦܬܐ . ܘܐܢܫܝܐ ܐܝܟ ܕܫܡܥ ܒܟܡܘܬܐ ܐܢܫܝܬܐ . ܘܢܟܦܘܬܐ ܝܠܗ ܥܡܠܬܐ ܡܢ ܦܠܚܘܬܐ ܐܢܫܝܬܐ . ܘܡܟܝܟܘܬܐ ܫܘܬܦܬܐ ܠܐ ܝܠܗ ܡܟܝܬܐ ܕܟܕܢܐ ܒܬܘܕܝܬܐ ܒܝܕ ܡܢ ܡܐ ܕܟܬܒܝ ܒܗ ܐܢܫܝܐ ܕܗܘܡ . ܐܝܢܐ ܝܠܬܐ ܕܟܬܒܝ ܝܠܗ ܕܬܘܡܦܐ ܦܠܝܛܐ ܡܢ ܢܟܕܐ ܝܠܗ ܒܟܬܒܗ ܫܡܫܘܬܐ . ܘܗܝ ܠܚܕ ܡܟܢܐ . ܝܠܗ ܒܗܕܐ ܐܘ ܢܗܕܐ . ܐܝܢܐ ܢܟܦܘܬܐ ܟܬܐ ܡܠܝܠ ܡܢ ܬܘܡܦܐ ܦܬܐ . ܐܚܪ ܒܬܘܟܠܢܐ ܕܫܡܫܘܬܐ . ܘܠܐ ܦܠܝܛ ܬܘܟܠܢܝܬܐ ܚܕ ܡܟܝܢ ܡܢܗ ܠܐ

ܦܠܛ ܒܬܫܥܝܬܐ ܕܒܥܘܪܐ ܐܘ ܒܡܘܕܐ. ܘܬܫܥܝܬܐ ܕܐܘܡܬܐ ܦܠܚܬܐ ܡܢ ܢܒܝܘܬܐ ܦܬܐ ܡܟܝܫܬܐ ܡܣܬܢܝܬ ܒܬܫܥܝܬܐ ܕܐܘܡܬܐ ܚܡܫܐ. ܘܐܦ ܗܘܡܬܐ ܕܐܘܡܬܐ ܐܘܪܚܢܐ ܡܕܪܫܬܐ ܬܫܥܝܬܐ ܚܡܫܝܢ ܫܢܝܐ. ܘܐܦ ܐܢܗ ܥܠܗ ܬܫܥܝܬܐ ܕܦܝܫ ܡܟܠܝܬܐ ܠܗܘ ܐܘܡܬܐ ܕܐܘܡܬܐ ܚܕܬܐ ܠܗ ܒܐܪܥܐ. ܘܟܕ ܬܫܥܝܬܐ ܚܡܫܝܢ ܕܢܒܝܘܬܐ ܟܕ ܦܬܐ ܒܡܟܬܐ.

ܣܝܡܘܬܐ ܕܐܬܪܐ ܚܕܬܐ ܠܐܘܡܬܐ:

ܦܪܝܫܐ ܗܘܐ ܐܬܪܐ ܚܕܬܐ ܒܣܝܡܘܬܗ ܠܐܘܡܬܐ ܚܡܫܐ. ܘܐܬܪܘܬܐ ܕܐܘܡܬܐ ܐܢܫܘܬܐ ܥܠܗ ܠܐܣܝܡܘܬܗ. ܘܡܕܪܫܐ ܢܛܪܬܐ ܠܬܘܪܥܝܗ ܡܢ ܥܕܬܐ. ܘܐܝ ܚܡܫ ܠܦܬܪܐ ܕܪܘܚܢܐ ܡܢ ܬܘܦܬܐ. ܟܕ ܫܘܥܠܗ ܥܠ ܚܕ ܕܪܬܐ ܥܠܬܐ ܡܢ ܬܘܕܬܐ. ܟܕ ܡܢܬܘܬܐ ܗܕܝܪܐ ܡܢܐ ܒܐܕܥܐ ܟܢܫܐ ܘܐܦܢ ܐܝܬ ܐܘܡܬܐ ܠܚܘܕܐ. ܦܬܚ ܡܟܠܝܫ ܒܐܣܝܡܘܬܐ ܠܐܬܪܐ ܥܠܗ

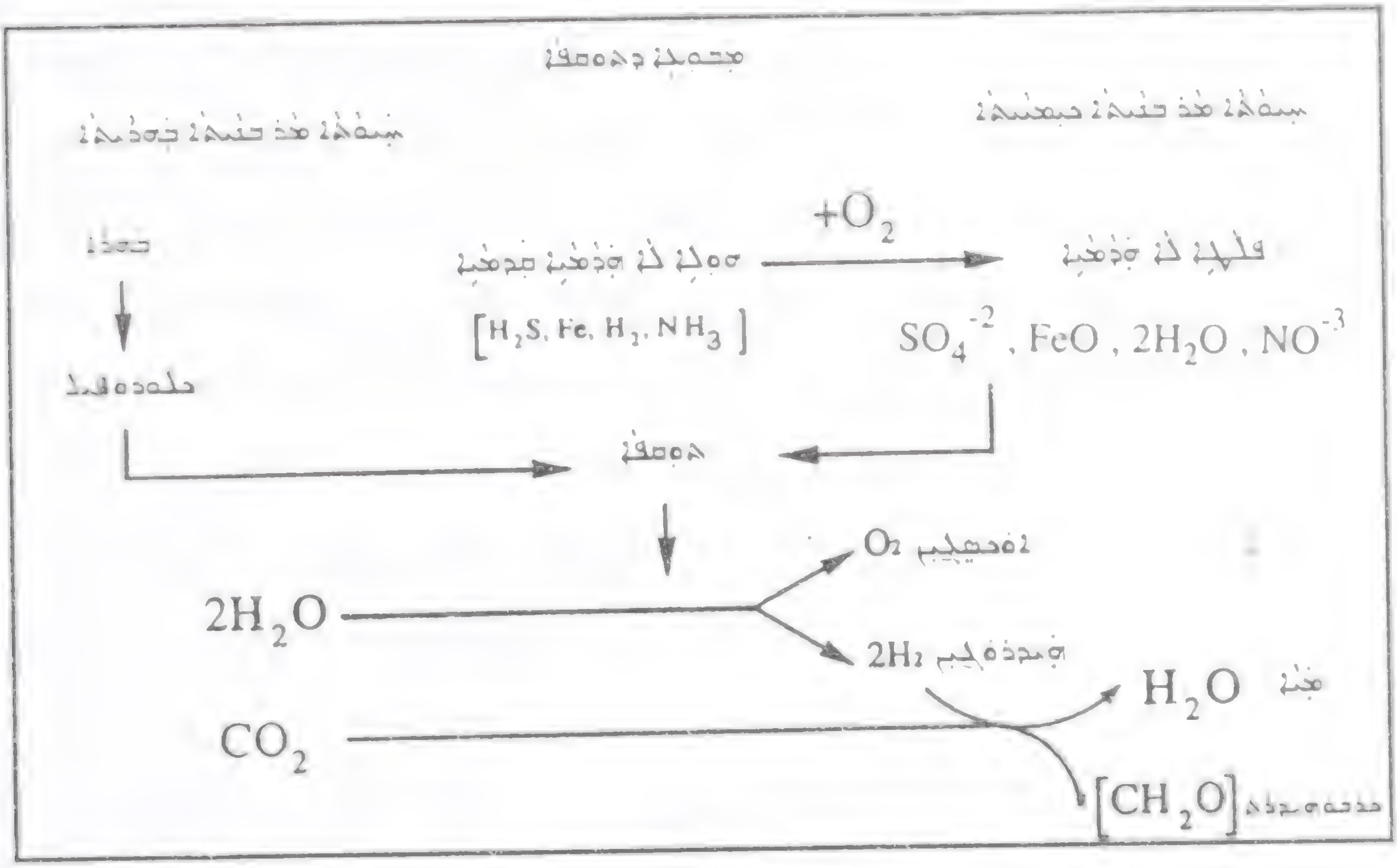
ܘܟܕܪܢܐ ܕܡܫܘܬܐ ܕܪܕܝܬܐ. ܥܠܢܐ ܡܫܬܘܕܥܢܐ ܡܢ ܦܠܛܬܐ ܕܐܘܡܬܐ. ܘܐܦ ܡܪܕܢܐ ܥܕܬܐ ܕܦܬܪܐ ܘܕܦܫܬܗ. ܘܡܬܚܬܐ ܕܡܢܬܘܬܗ ܠܐܚܝܢܘܬܐ ܕܐܘܡܠܘܬܐ ܥܡ ܡܫܘܕܪܐ. ܘܐܘܡܬܐ ܠܗ ܦܬܪܐ ܚܢܐ ܡܢܝܢ ܥܠܐ ܡܢܘܬܐ ܕܥܠܐ ܡܬܚܬܗ ܠܗܝ ܐܚܝܢܘܬܐ. ܘܗܘ ܦܝܫ ܕܗܬܪܬ ܥܡ ܕܪܥܐ ܕܬܘܦܬܐ. ܘܡܬܐ ܕܗܘܝ ܐܬܫܥܝܬܐ ܕܚܘܬܐ ܟܕ ܒܬܘܪܐ. ܟܕ ܒܗܘܝ ܒܬܘܦܬܐ ܥܡ ܬܚܘܪܘܬܐ ܕܐܘܡܬܐ ܐܪܥܐ ܥܠܝܗ.

ܡܢܝܢܐ ܕܐܘܡܬܐ:

ܡܢ ܡܢܝܢ ܕܡܢܝܢܐ ܚܘܬܐ ܥܠ ܦܐܬܐ ܕܐܪܥܐ. ܡܬܐܠܦ ܐܘܡܬܐ ܥܡܡܐ ܘܐܘܡܬܐ ܒܗܪܢܝܐ. ܦܠܛܐ ܡܢ ܕܘܟܝܐ ܒܗܪܟܢܐ ܒܐܬܢܐ ܕܦܪܚܘܢܬܐ ܚܕ ܒܪܐ ܐܢܫܐ ܠܗ ܬܘܪܐ ܚܡܫܐ. ܐܘܟܝ ܠܗ ܟܢܬܐ ܕܡܢܬܘܢܝܬܐ ܗܕܡܝܬܐ ܡܬܠܦܢܬܐ. ܡܢ ܦܠܚܘܬܐ ܕܡܢܬܘܢܝܬܐ ܠܐ ܗܕܡܝܬܐ ܦܫܝܛܬܐ. ܘܚܕ ܗܘܡܐ ܡܢ ܗܘ ܐܘܡܬܐ ܪܒܐ ܦܬܐ ܗܘܐ ܡܟܝܫܐ ܠܗ ܐܚܘܕܘܬܐ ܐܝܟ ܕܐܬܪܝ ܠܒܢܬܐ ܪܘܟܒܐ ܚܕܬܐ. ܘܟܠ ܢܦܫܐ ܥܠ ܐܪܒܥܐ ܕܐܘܐ ܬܘܪܐ ܚܡܫܐ ܡܬܚܝܠܬܗ. ܗܘܚܕܐ ܕܚܘܬܐ. ܘܡܢ ܗܝ ܟܪܟܐ ܗܠ ܢܘܡܪܐ. ܡܬܪܥܠܗ ܥܡܡܐ ܒܡܬܪܬܐ

ܕܐܝܬܝܗ ܚܝܐ ܒܗܘܦܟܐ. ܐܝܟܢܐ ܠܓܢܣܐ ܕܬܘܪܣܝܐ. ܘܚܝܘܬ ܗܘܐ ܡܢܘܬܐ ܠܗ ܒܬܘܪܐ ܕܫܢܬܐ ܘܚܝܘܬܐ. ܐܘ ܠܗ ܒܡܫܚܬܐ. ܗܢ ܕܡܢܬܐ ܓܠ ܐܬܬܩܢ ܕܓܠܝܐ ܡܢ ܚܠܘܪܘܦܝܠ.

ܘܠܕܘܟܬܐ ܕܐܝܬ ܚܝܐ ܒܚܝܘܗܝ ܚܕ ܐܕܢܐ ܐܚܪܢܐ ܓܒܐ ܠܗܘܦܟܐ ܦܠܝܚܐ ܡܢ ܐܬܬܩܢܬܐ ܕܡܠܘܐܐ ܠܐ ܐܘܪܓܢܝܐ. ܒܡܫܪܝܬܐ ܕܬܘܪܣܝܗ. ܐܝܟ ܒܡܫܚܬܐ ܕܡܢܬܝܐ ܘܦܪܙܠܐ ܘܡܫܪܝܬܐ. ܘܡܢܗܘܢ ܐܝܬ ܗܘܐ ܡܫܪܪܐ ܠܗܕܐ ܡܬܘܒܐ ܐܬܐ ܠܗܘܦܟܐ ܚܘܠܡܢܐ ܒܟܠܗ :



٦ - ܡܦܠܚܬܐ ܕܗܘܦܟܐ :

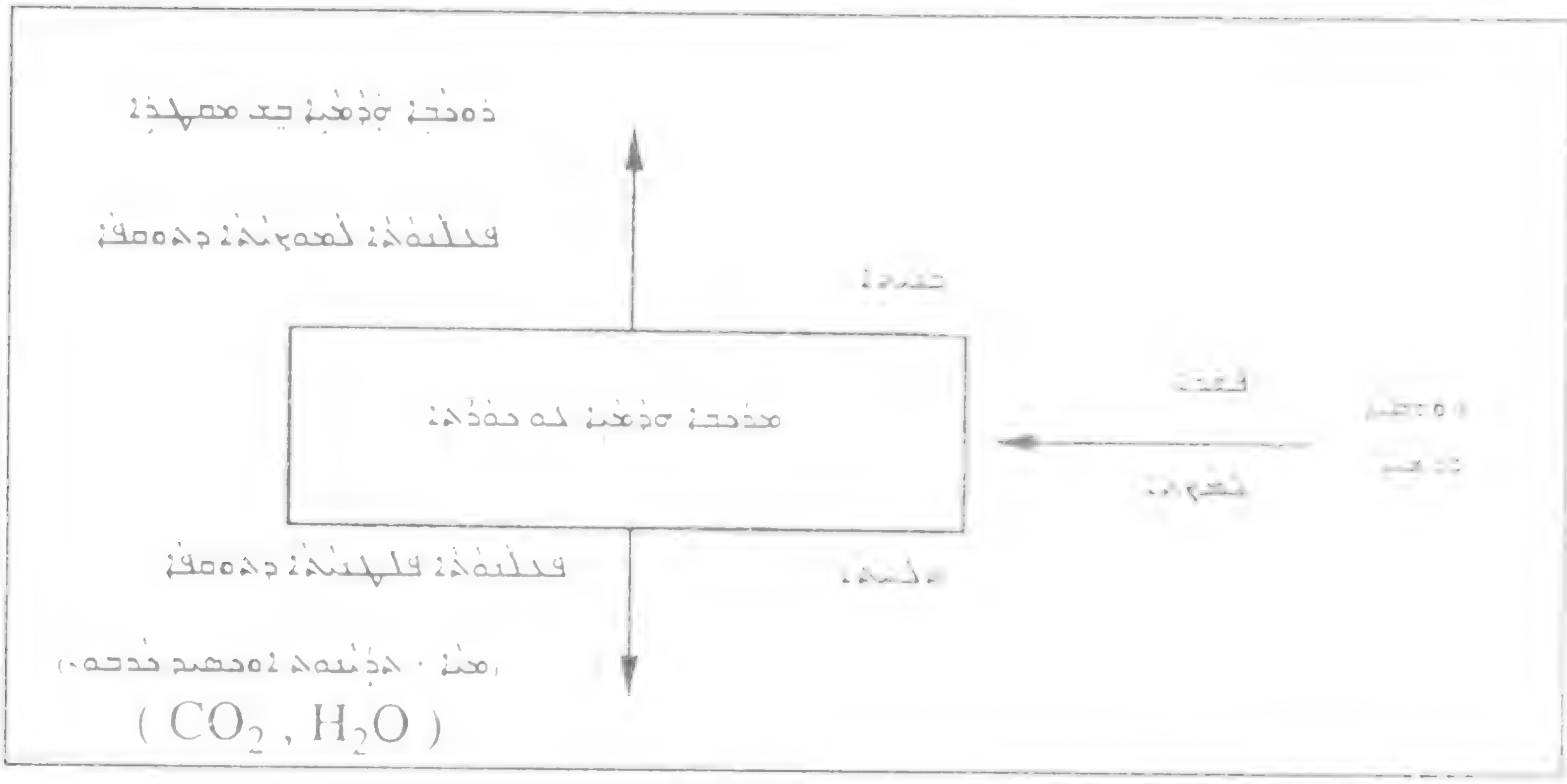
ܒܬܪ ܠܗ ܕܘܪܫܐ ܕܐܝܬܝܐ ܚܝܐ ܒܟܠܗ ܗܘܦܟ ܚܝܝܐ ܩܢܝܢ ܬܪܝܢ. ܡܢܝܢܐ ܐܠܘ ܕܦܪܝܫܝܢ ܡܢ ܚܕܕܐ ܒܬܪ ܗܘܢܝܐ ܬܪܝܢ :

ܩܕܡܝܐ . ܐܬܩܪܝ ܠܗ ܒܢܝܢܐ (Anabolism) . ܐܘܟܝܬ ܒܢܝܢܐ ܕܪܘܟܒܐ ܡܠܘܐܐ ܦܫܝܛܐ ܘܡܬܪܟܒܝܢ ܡܢ ܪܘܟܒܐ ܐܝܟܢܐ ܠܚܘܕܝܗ. ܐܝܟ ܫܟܪܐ ܘܠܚܘܦܝܐ ܘܡܫܚܐ. ܘܦܫܬܐ ܗܢܐ ܡܬܘܡܝܐ ܦܠܚܘܬܐ ܡܦܘܫܬܐ ܠܗܘܦܟܐ (Endergonic) .

ܘܬܪܝܢ . ܐܬܩܪܝ ܠܗ ܒܫܪܝܐ ܐܘ ܗܕܡܐ (Catabolism) . ܐܘܟܝܬ ܦܠܚܬܐ ܕܪܘܟܒܐ ܡܫܪܝܐ ܠܦܫܝܛܐ. ܘܡܦܩܬܐ ܕܚܝܠܐ ܡܢ ܗܘܦܟܐ

ܘܡܫܡܫܬܐ ܦܠܚܬܐ . ܘܡܦܠܚܝܢ ܠܗ ܒܥܒܘܕܘܬܐ ܒܢܝܢܐ ܕܓܘܫܡܐ .
ܘܦܫܛܐ ܗܢܐ ܡܫܘܡܗܐ ܦܥܠܘܬܐ ܐܠܨܝܬܐ ܡܦܠܚܢܝܬܐ ܕܓܘܫܡܐ :

ܡܚܘܝܢܢ ܠܗ ܡܕܥܢܘܬܐ ܕܗܢܐ ܡܥܡܠܐ ܒܐܝܕܐ ܡܫܒܚܬܐ :



ܘܦܫܛܐ ܡܫܘܚܠܦܐ ܗܘܦܟܐ ܦܠܚܬܐ ܡܢ ܦܥܠܘܬܐ ܐܠܨܝܬܐ ܦܪܝܫܝܢ ܒܐܝܕܐ ܕܚܝܘܬܐ ܕܐܝܬ ܗܢܐ ܒܢܝ :

١ . ܝܗܒܬܐ ܕܦܥܠܘܬܐ ܒܢܝܢܝܐ ܠܗ ܓܘܫܡܐ .

٢ . ܡܬܠܒܟ ܕܓܘܫܡܡܠܝܬܐ ܘܡܫܬܠܛܘܬܐ ܕܦܘܫܟܐ ܠܒܢܝܐ ܘܥܪܩܝܬܐ ܓܘܫܡܝܬܐ .

٣ . ܡܠܒܫܬܐ ܕܓܘܫܡܐ ܘܚܘܡܐ ܘܙܘܥܐ ܘܡܬܚܪܬܐ ܕܡܣܒܘܪܐ ܠܗܢܐ ܗܘܝܐ .

٢ . ܗܘܦܟܐ ܒܢܝܢܝܐ ܠܗ ܗܘܕܡܐ :

ܡܢ ܗܢ ܕܡܥܡܠܝܢ ܦܫܛܐ ܗܠܝܢ ܠܒܢܝܐ ܐܝܬܘܬܐ ܕܗܘܕܡܐ . ܗܘ ܕܐܝܬܘ ܡܫܘܚܠܦܐ ܕܗܘܦܟܐ ܘܡܫܡܫܬܐ ܐܝܬܘܬܐ ܠܐܝܬܘܬܐ ܕܚܝܘܬܐ ܘܥܒܕܬܐ ܘܡܠܒܫܬܐ ܕܓܘܫܡܐ ܘܚܘܡܐ ܚܝܝܢܐ . ܘܦܫܛܐ ܒܗܠܝܢ ܗܘܦܟܐ ܒܢܝܢܝܐ ܠܗ ܗܘܕܡܐ ܘܐܝܬܘܬܐ ܕܦܓܪܐ ܡܢܗ . ܒܗܢܐ ܕܡܫܘܡܗܐ ܗܢܐ ܒܥܒܘܕܘܬܐ ܡܫܡܫܢܝܬܐ .

ܦܝܫ ܡܢ ܡܫܘܚ̈ܬܐ ܟܠܘܪܝܬܐ ܕܗܝ ܝܠܗ ܡܫܘܚܬܐ ܕܚܡܝܡܘܬܐ ܐܢܫܝܬܐ ܠܡܪܡܝܘܬܐ ܕܕܪ̈ܓܐ ܕܚܡܝܡܘܬܐ ܐܢܫܝܬܐ ܕܚܕ ܓܪܡܐ ܡܢ ܡܝ̈ܐ ܢܩܕ̈ܝܐ . ܚܕ ܕܪܓܐ ܐܡܝܢܐ ܘܗܝ ܝܠܗ ܚܕܘܬܐ ܕܟܠܐ ܘܟܠܘܪ̈ܝܬܐ . ܟܠ ܕܐܪܐ ܒܝ ܡܩܠܣ ܚܠܐ ܟܠܘܪܝܬܐ . ܐܘܟܝ ܐܠܦܐ ܟܠܘܪܝܬܐ ܘܟܠܘܪ̈ܝܬܐ ܣܠܩܝܢ . ܘܩܪܝܢ ܡܢܗܘܢ ܟܟܠܘܪܝܬܐ ܪܘܪܒܬܐ .

ܦܝܫ ܣܘܥܪ̈ܢܐ ܕܡܘܩܕܐ ܚܡܝܡܐ ܠܗ ܡܘܙܢܐ ܚܡܝܡܘܬܗ ܠܗ ܚܕ ܦܪܢܐ ܕܝܠܗ̈ܢ ، ܚܡܝܡܘܬܐ ܕܦܪܣܘܚܬܐ ܕܡܕܢܚܬܐ . ܘܗܘܐ ܦܝܫ ܡܚܘܡܘܐ ܡܫܚܬܐ ܕܩܠܡܛܪܐ (Bomb Calorimeter) . ܘܡܛܝܢܬܐ ܕܦܬ̈ܐ ܡܬܚܫܒܬܐ ܚܡܝܡܘܬܐ ܕܚܡܝܡܘܬܐ ܦܠܛܬܐ ܡܢ ܡܘܩܕܢܘܬܐ ܕܡܘܙ̈ܢܐ . ܘܦܝܫ ܠܗ ܣܘܝܬܐ ܕܡܘܩܕܐ ܚܡܝܡܐ ܠܗ ܐܪܒܥܐ ܕܪ̈ܓܐ ܡܢ ܡܘܙ̈ܢܐ ܝܠܗ ܐܝܟ ܕܒܬܪܗ ܝܠܗ :

٤ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ ܠܟܠ ܓܪܡܐ ܡܢ ܟܪܒܘܗܝܕܪܬܐ .

٩ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ ܠܟܠ ܓܪܡܐ ܡܢ ܡܫܚܐ .

٤ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ ܠܟܠ ܓܪܡܐ ܡܢ ܦܪܘܬܝܢܐ .

(ܐ. ܦܝܫ ܠܗܘܢ ܡܘܦܠܣܐ ܚܕ ܚܘܕܬܐ ܕܦܓܪܐ ܠܝܒ̈ܫܐ ܕܦܠܛܬܐ ܕܡܘܩܕܐ ܘܚܡܝܡܘܬܐ) .

ܦܬܐ ܡܚܘܡܘܡܬܐ ܗܝܡܢܘܬܐ ܕܦܓܪܐ ܠܗ ܚܪ̈ܢܐ ܕܦܠܣ ܚܕ ܒܘܥܕܐ ܢܘܡܪܐ ܚܢܝܢܐ ، ܡܘܦܩܬܐ ܠܗܝܡܢܘܬܗ ܡܢ ܦܪܘܬܝܢܐ . ܠܒܫ̈ܐ ܕܪܒܝܬܐ ܘܡܛܪܬܐ ܒـ 2.٨٠٠ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ ، ܘܡܛܠ ܕܡܢܐܠܗܘܢ . ܗܝܡܢܐ ܝܠܗ ܠܣܒܐ ܒܪ̈ܢܐ ܡܘܙܢܬܐ ܚܫܝܚܬܐ . ܐܝܟ ܕܦܬ̈ܐ ܡܚܘܒܪܬܐ ܡܢ :

٣٧٥ ܓܪ̈ܡܐ ܡܢ ܟܪܒܘܗܝܕܪܬܐ	١.٥٠٠ ܟܠܘܪ̈ܝܬܐ ܪܘܪ̈ܒܬܐ
١٠٠ ܓܪ̈ܡܐ ܡܢ ܡܫܚܐ	٩٠٠ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ
١٠٠ ܓܪ̈ܡܐ ܡܢ ܦܪܘܬܝܢܐ	٤٠٠ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ
٢.٨٠٠ ܟܠܘܪܝܬܐ ܪܘܪܒܬܐ	

ܡܘܦܩܬܐ ܠܟܠܗܝܢ ܐܪܒܥܐ . ܗܝܡܢܐ ܝܠܗ ܦܓܪܐ ܠܪܒܝܬܗ ܘܡܛܒܬܐ ܕܟܒܘܪܗ ܚܘܠܡܢܐ ܠܚܝܡܝܢ ܘܡܠܝܢ ܣܘܥܪܢܐ ܘܡܢܐ . ܘܐܢܫܝܢܘܬܐ ܕܦܪܫܐ ܐܘ ܡܘܬܪܐ ܕܡܘܙܢܐ . ܓܒ ܦܓܪܐ ܠܡܦܠܣܐ ܕܡܩܒܠ ܡܢ ܒܥܝܐ

ܫܘܬܦܢܐ ، ܠܠܡܘܠܟܢ ، ܠܗ ܒܓܒܪܐ . ܘܢܡܛܐ ܠܗܘ ܡܦܠܣܬܐ ܕܡܣܟܢܐ
ܘܦܪܘܫܝܐ ܡܢ ܘܡܘܕܐ ܕܦܓܪܐ ܒܝܬܗ . ܘܐܝ ܡܓܕܫܐ ܐܢܫܘܬܐ ܒܥܠܡܐ
ܒܟܪܬܐ . ܒܡܫܝܚܐ ܕܐܪܒܥܐ ܟܘܡܟܐ . ܘܗܘܐ ܠܘܡܕܐ ܕܦܓܪܐ ܒܗܘ ܒܢܝܢܐ
ܡܫܢܐ ܠܦܠܓܐ .

٨ . ܡܫܠܡܢܘܬܐ ܗܘܦܟܬܐ ܠܗ ܐܝܬܝܐ ܣܓܝܐ ܟܘܪܗܢܐ .

ܗܘܝ ܡܫܟܚܐ ܒܢܝܐ ܠܐܝܬܝܐ ܣܓܝܐ ܟܘܪܗܢܐ ܒܡܘܪܗܢܐ ܠܐܢܫܐ ܡܓܒܪܐ ܠܗܘܢ . ܒܕ ܒܪܐ ܐܘܟܝܠ ܒܐܘܪܚܐ ܕܦܪܗܛܐ ܡܢ ܡܫܚܐ ܕܠܒܗ ܠܗܘ ܐܢܐ ܐܬܐ ܠܓܘܐ ܕܟܘܪܗܢܐ ܘܡܟܝܟ ܝܘܡܐ ܗܡܘܦܠܓܢܐ ܕܟܘܪܗܢܐ ܠܦܪܗܛܗ ܘܟܦ ܐܬܗ ܠܗ ܥܠܗ ܒܢܝܐ ܕܟܘܪܗܢܐ . ܕܡܟܘܠܟ ܠܗ ܡܚܘܪܘܬܐ ܕܢܦܫܘܬܐ ܘܡܫܟܚܐ ܥܠ ܗܘ ܡܚܒܠܢܘܬܐ ܕܪܕܝܬܐ ܕܗܡܘܦܠܓܢ . ܠܗ ܒܒܪܢܫܐ . ܒܪܢܫܘܬܐ ܕܦܪܗܛܘܬܗ ܚܝܠܗ ܡܚܘܪܒܢܐ . ܘܫܘܢܐ ܕܘܪܕܐ ܕܗܡܘܦܠܓܢ ܠܗܘ . ܐܝܬ ܗܕܝܢ ܐܘܟܝܢܐ ܕܒܕܪܗ . ܦܠܝܓܐ ܡܢ ܡܚܘܪܘܬܐ ܕܢܦܫܘܬܐ . ܐܦ ܗܘ ܦܠܝܓ ܡܢ ܠܗ ܟܘܪܗܢܐ ܠܡܫܚܐ ܒܪܢܫܐ ܗܪ ܒܗܘ ܐܘܪܚܐ . ܘܒܠܗ ܦܪܗܛܐ .

ܘܦܪܗܛܐ ܥܠܗ ܝܘܡܐ ܕܡܢܬܘܢܝܬܐ ܐܘ ܐܝܕܐ ܕܚܠܘܐܐ . ܘܡܫܢܝܬܗ ܡܢ ܕܘܟܐ ܕܗܘܢܐ ܡܫܘܚܬܗ ܠܗܘ ܥܠܝܬܐ . ܠܕܘܟܐ ܕܗܘܢܐ ܡܫܘܚܬܗ ܠܗܘ ܒܝ ܟܘܪܗܢܐ . ܒܕ ܐܬܠܗܘܢ ܡܢܬܘܢܝܬܐ ܕܚܠܘܐܐ ܡܢ ܗܘܡܦܐ ܡܢܐ ܕܟܒܕ ܠܗ ܡܫܚܐ ܡܢ ܝܘܡܐ . ܡܟܠ ܕܐܝܬ ܡܟܝܟܐ ܐܘܟܝܠ ܡܢ ܡܫܚܐ ܝܘܡܐ . ܘܦܬܐ ܡܫܘܚܬܗ ܠܗܘ ܒܝܘܡܐ ܥܠܝܬܐ ܠܓܒܐ ܕܒܝܐ ܐܝܬܝܐ ܣܓܝܐ ܟܘܪܗܢܐ . ܒܕ ܗܘܢܐ ܡܫܘܚܬܗ ܠܗܘ ܟܘܪܗܢܐ . ܡܟܠ ܣܝܡܢܐ ܐܘ ܠܗܘܐ ܝܘܡܐ . ܘܗܘܐ ܡܟܒܪܢܐ ܠܟܢܫܐ ܐܝܟ ܡܢܬܘܢܝܬܐ . ܘܡܫܦܪܐ . ܗܕܝܢ ܐܘܟܝܢܐ ܕܒܕܪܗ . ܕܦܠܝܓ ܡܢ ܢܦܫܘܬܐ . ܦܬܐ ܡܫܘܚܬܗ ܒܝ ܥܠܝܬܐ ܟܒܬܐ ܕܒܝܐ ܟܘܪܗܢܐ . ܡܟܠ ܕܐܝܬ ܡܟܝܟܐ ܡܢ ܠܗܘܐ ܠܡܫܚܐ ܝܘܡܐ . ܘܡܟܘܠܟ ܢܦܫܬܐ ܡܫܘܚܬܐ ܟܒܕܝܐ ܕܗܘܠܗ ܠܗ ܒܒܪܢܫܐ ܒܦܬܐ ܕܐܦ ܚܕܐ ܟܡܘܬܐ ܡܢ ܗܕܝܢ ܐܘܟܝܢܐ ܕܒܕܪܗ . ܡܦܠܣ ܟܘܪܗܢܐ ܦܪܗܛܢܬܐ * ܠܡܦܠܓܘܬܐ ܠܐ ܗܘܝܐ . ܡܟܠ ܡܠܠܗ

---

* ܠܫܘܬܐ ܕܐܝܬܘܬܐ ܕܢܦܫܬܐ ܡܫܘܚܬܐ ܠܗ ܟܒܕܝܬܐ ܦܪܗܛܢܬܐ ܡܟܠ ܫܘܬܐ ܕܡܫܘܚܬܐ ܒܝ ܗܡܘܦܠܓܢ ܘܡܫܚܐ ܕܒܝܐ ܠܗܘ

ܡܬܡܢܝܢܘܗܝ ܒܐܘܪܚܡܟܝܢ ܡܢ ܡܟܝܠܘܗܝ . ܘܡܛܠ ܗܘܫܠܡܬܐ ܗܘܦܟܐ ܥܠ ܦܪܨܘܦܗ ܡܢ ܚܕ̈ܐ ܐܘܟܡܝܬܐ ܕܟܪܟܐ . ܡܟܠܝܢܐ ܠܡܦܩܬܗ ܠܐ ܦܠܓܘܗܝ ܘܗܘ ܟܪܝܐ ܟܦܪܨܘܦܐ . ܘܒܟܠ ܡܟܝܢܐ ܕܦܪܨܘܦܐ ܕܗܘܦܟܐ ܥܠ ܣܦܪܝܐ ܠܡܘܠܐ ܡܢܗ :

١ . ܣܘܡܪܐ ܡܢܬܘܢܝܬܢܝܐ ܕܗܘܦܟܐ . ܘܠܡܢܐ ܕܫܘܩܪ ܣܘܡܪܐ ܡܢܬܘܢܝܬܢܝܐ ܐܝܟ ܡܟܝܠܐ ܕܦܪܨܘܦܗ .

٢ . ܦܘܪܫܢܐ ܟܡܟܘܢܐ ܕܗܘܦܟܐ ܥܠ ܚܕ̈ܐ ܠܒܒܢܐ ܕܡܫܚܬܐ ܕܢܩܝܒܘܬܐ . ܘܠܡܢܐ ܕܗܘܐ ܦܘܪܫܢܐ ܠܟܘܪܐ . ܐܝܟ ܡܟܝܠܐ ܕܦܪܨܘܦܐ .

٣ . ܠܟܘܪܘܬܐ ܕܡܫܚܬܐ ܕܢܩܒܘܬܐ . ܘܠܡܢܐ ܕܘܪܕܐ ܠܟܘܪܘܬܐ ܕܡܫܚܬܐ ܕܢܩܒܘܬܐ . ܐܝܟ ܡܟܝܠܐ ܕܦܪܨܘܦܐ .

٤ . ܡܟܘܫܬܐ ܕܡܫܚܬܐ ܕܟܪܝܐ ܦܪܨܘܦܐ ܡܢ ܠܐܘ .

٥ — ܗܘܫܠܡܬܐ ܗܘܦܟܐ ܠܐ ܦܬܘܪܬܢܝܬܐ :

ܐܝܬ ܠܐ ܦܬܘܪܬܢܝܬܐ . ܗܠܘܪܘܬܐ ܕܗܘܫܠܡܬܐ ܗܘܦܟܐ ، ܢܩܒܘܬܐ ، ܟܪܝܐ ܠܐ ܡܘܪܟܢܘܗܝ . ܘܟܠܗ ܐܝܬ ܚܕܐ ܐܘܟܡܝܬܐ . ܘܡܪܟܒ ܗܪܝܢܘܬ ܐܘܟܡܝܬܐ ܕܟܪܟܐ . ܘܠܟܪܟܪܐ ܕܗܘ ܦܝܫ ܟܡܝܪܐ ܐܘܐ ܢܘܩܐ :

ܦܝܫ ܦܠܝܓܐ ܚܕ ܡܢܐ ܐܬܠܬܢܝܐ ܠܟܠ ܗܘܡܪܐ ܟܡܟܝܠܘܬܐ ܕܚܕ ܡܟܪܟܐ ܚܦܪܐ . ܦܝܫ ܡܬܟܪܝܐ ܠܐ ܚܕ ܗܘܡܪܐ ܦܬܘܪܬܢܝܬܐ ܕܟܪܝܬܐ ، ܘܦܝܫ ܕܟܪܝܐ ܡܢܐ . ܐܦ ܡܬܟܪܟܪܐ ܠܗܘܦܟܐ ܠܐܘܟܡܐ ܠܐ ܗܘܡܪܐ ܟܬܠܬܐ ܡܢ ܡܢܐ ܟܪܟܝ . ܐܦ ܦܝܫ ܩܪܝܒܐ ܗܘܦܟܡܝܐ ܕܟܠܗܘܢ ܠܐ ܗܘܡܪܐ ܟܬܠܬܐ . ܗܘ ܟܕ ܡܟܝܠܝܢ ܟܠܗܘܢ ܚܘܪܐ . ܡܢ ܦܠܓܐ ܕܗܘܟܡܐ ܕܟܪܟܘܢܝܬܐ ܕܟܠܗܘܢ .

ܘܦܬܘܪܬܢܝܬܐ ܡܬܦܫܩܢܐ . ܗܘܦܟܐ ܕܐܟܝܢܘܬ ܐܘܟܡܝܬܐ ܕܟܪܟܐ . ܗܘ ܕܗܘܦܐ ܥܠܬܐ ܟܡܟܠܐ ܕܦܘܪܫܐ . ܘܫܘܬܦܐ ܕܗܘܦܟܡܝܐ ܕܟܠܗܘܢ .

١٠ ـ ܡܘܫܠܦ̈ܐ ܗܘܦ̈ܐ ܓܘ ܢܒܛܐ :

ܓܠܠܗ ܢܒܛܐ ܗܘܝܐ ܕܠܐܝܬ ܒܐܘܫܠܦ̈ܐ ܗܘܦ̈ܐ ܒܕ ܡܘܚܠܐ ܒܪ̈ܒܐ . ܘܓܘ ܢܒܛܐ ܡܝܬܝܬܐ ܗܘܝ ܓܠܝܗ ܒܗܘܕܐ ܢܫܕܐ ܠܡܘܪ̈ܒܐ ܒܡܫܚܬܐ ܒܡܫܘܕܥܬܐ ܒܪ̈ܒܐ . ܘܡܢܝ̈ܐ ܐܘܟܣܓܝܢ ܡܢ ܡܫܚܬܐ ܠܗܘܕܐ ܡܫܕܪܢܝܬܐ . ܡܢ ܓܘ ܐܘܪܚܐ ܕܗܘܪ̈ܒܬܐ . ܒܗܕ ܗܕܟ ܠܓܘ ܢܒܛܐ ܠܐܘܪܚܐ ܕܦܩܘܕܬܐ ܗܘܝܬܐ . ܐܦ ܡܪܝܒ ܫܒܩܢܐ ܡܢܗ ܓܘ ܡܢܐ ܕܢܒܛܐ . ܘܡܢܝ̈ܐ ܠܐܒܘܪ̈ܐ ܡܫܠܚܢܐ . ܐܝܟ ܕܡܬܢܝܠܗ ܠܗܘܡܢܐ ܡܫܠܦ̈ܐ ܕܚܡܐ ܘܒܪ̈ܕܐ . ܘܟܠܕ ܐܘܟܣܓܝܢ ܠܢܒܛܐ ܐܦ ܡܢ ܓܘ ܒܪ̈ܕܐ . ܘܗܘ ܡܪܝܒܐ ܓܘ ܡܢܐ ܕܠܦܪ̈ܐ . ܘܡܟܡܝܢ ܒܗܘܕܐ ܕܒܪ̈ܕܐ ܒܡܠܝܠ ܡܢܗ . ܘܡܢܝ̈ܐ ܒܪ̈ܕܢܐ ܠܡܢܝܐ ܕܫܡ̈ܐ . ܐܝܟܐ ܕܦܝܫ ܦܠܝܓܐ ܠܗܘܡܕܐ ܕܒܪ̈ܡܐ . ܗܘܪ̈ܒܬܗ ܡܦܪ̈ܕܝ ܐܘܪܚܐ ܗܠܝܬܐ ܠܗܘܐ ܐܦ ܝܡܘܕܐ ܢܕܘܡܐ ܡܦܠܝܚ ܐܘܟܣܓܝܢ ܓܘ ܡܚܪܘܒܬܐ ܕܒܢ̈ܝܐ ܒܪ̈ܒܐ . ܘܗܘܐ ܫܕ ܡܚܘܠܐ ܐܫܕܢܐ ܠܐܗܘ ܗܘܦ̈ܐ .

ܐܝܟܐ ܗܪ̈ܡܘܬ ܐܘܟܣܓܝܢ ܕܒܪ̈ܒܗ . ܦܠܝܓܐ ܡܢ ܡܚܪܘܒܬܐ ܕܢܦܫܘܬܐ ܓܘ ܢܒܛܐ ܡܝܬܝܬܐ . ܟܠܗ̈ܝ ܦܕܡ ܡܫܕܪܢܝܗ ܠܐܘܪܚܐ ܒܪ̈ܒܐ ܡܢ ܗܘܕܐ . ܐܫܝܢ ܕܓܠܝܗ ܒܓܒܘܦ̈ܐ ܒܕ ܚܦܕܐ ܗܘܐ . ܐܝܟܐ ܗܘܕܐ ܒܡܫܚܬܐ . ܡܦܠܝܚ ܗܪ̈ܡܘܬ ܐܘܟܣܓܝܢ ܕܒܪ̈ܒܗ . ܠܡܢܝ̈ܐ ܕܡܫܐ . ܠܐ ܐܒܘܪ̈ܐ ܡܫܠܚܢܐ . ܘܟܠܕ ܗܘܦ̈ܐ ܡܢ ܓܘ ܗܘܪ̈ܒܬܐ ܠܐܝܕ . ܘܗܘܕܐ ܡܚܠܦܬܐ ܕܗܘܦ̈ܐ ܢܦܫܘܬܝܐ ܓܘ ܢܒܛܐ ܒܪ̈ܘܚܐ ܓܠܝܗ ܡܫܕܪܢܝܬܐ . ܒܕ ܪ̈ܒܐ ܡܢ ܝܡܘܕܐ ܫܢܐ ܓܠܝܗ ܒܡܫܚܬܐ ܡܫܕܪܢܝܬܐ ܒܒܕܘܡܐ ܒܪ̈ܒܐ . ܘܡܘܒܕܐ ܠܐ ܐܒܘܡܐ ܕܡܚܪܘܒܬܐ ܕܒܢ̈ܝܐ ܒܗܘܕܐ ܗܘܦܕܐ ܠܢܦܫܘܬܐ ܓܘ ܢܒܛܐ ܝܒܘܫܬܐ . ܠܦܬܚܐ ܕܢܦܫܘܬܐ ܫܒܘܒܬܐ ܓܘ ܢܒܛܐ ܠܝܒ ܡܕܫܐ ܐܪ̈ܒܥܐ . ܐܝܟܐ ܡܝܬܝܬܐ ܠܐ ܡܬܢܝܬܐ ܒܫܒܩܢܐ ܒܘܦ̈ܐ

ܘܐܝܬ ܠܗܘܬܐ ܠܐܪ̈ܐ . ܕܦܠܝܣܢܛܝܬܐ (Lenticeis) ܟܪ̈ܒܝ ܓܘ ܟܡܝܐ ܐܪ̈ܒܥ ܓܢ̈ܐ . ܒܕܘܟܐ ܕܗܘܪ̈ܒܬܐ . ܐܝܟ ܡܦܠܚܢܘܬܐ ܠܡܘܫܠܦ̈ܐ ܗܘܦ̈ܐ . ܡܦܠܚ ܝܒܘܫܬܐ ܕܗܘܪ̈ܒܬܐ . ܘܟܪ̈ܒܐ ܕܦ̈ܐܐ . ܦܠܝܓܐ ܡܢ ܕܒܝܬܐ ܕܝܠܢܝܬܐ .

١١ ـ ܡܘܫܠܦ̈ܐ ܗܘܦ̈ܐ ܓܘ ܢܒܛܐ ܝܒܘܫܬܐ :

ܠܒܢ̈ܐ ܕܡܫܢܝܬܐ ܕܡܘܫܠܦ̈ܐ ܕܗܘܦ̈ܐ ܓܘ ܢܒܛܐ ܝܒܘܫܬܐ . ܥܡܕܐ ܡܢ ܦܕܪ̈ܐ ܡܢ ܓܘܦܬܐ ܗܫܘܗ ܫܕ ܢܦܫܐ ܘܓܘܒܝܬܢܐ . ܡܘܗܒܢ ܒܕ ܫܕܐ ܝܒܫܬܐ ܘܓܘܒܝܬܢܐ ܒܒܝܬܐ . ܒܗܕ ܗܕܟ ܕܟܕܝ ܠܐܘܪܚܐ ܒܗܕܡܐ ܕܠܒܬܐ

ܠܡܥܠܝܬܐ ܕܚܘܡܨܐ ܕܗܘܝܐ ܡܢ ܒܗܪܐ ܘܐܝܬ ܕܢܘܗܪܐ . ܘܡܛܠ ܗܕܐ ܠܐ ܢܘܗܪܐ
ܣܓ ܡܢܝܢܐ ܟܡܝܬܐ ܥܠ ܗܝܕܪܘܟܣܝܕܐ ܕܟܠܣܝܘܡ . ܘܡܟܝܠܘ ܡܢܝܢܐ ܕܡܝܐ
ܒܝܬܐ ܠܐ ܣܓܝܐ . ܟܣܝܡ ܟܕ ܗܘܝ ܕܝܗܒܝܢ ܕܡܢܝܢܐ ܦܝܫܐ ܡܢܘܗܝܢܐ ܟܡܝܐ
ܟܘܡܝܬܐ ܕܡܘܬܐ ܣܘܪܬܐ ܡܢ ܟܪܟܘܡܝܬܐ ܕܟܠܣܝܘܡ . ܘܐܝܬ ܕܐܝܟ ܠܡܥܒܪܢܘܬܐ
ܕܗܘܝܐ ܕܐܪܡܘܬ ܐܘܟܣܝܕܐ ܕܟܪܟܘ . ܟܝܢ ܢܝܫܐ ܠܐ ܡܟܘܪܘܬܐ ܕܢܝܫܘܬܐ
ܘܐ . ܡܬܟܢ ܣܓ ܢܘܗܪܐ ܐܣܪܢܐ ܕܠܐ ܢܝܫܐ ܗܣܘܐ ܗܪ ܐܝܟ ܢܝܫܘܬܐ . ܗܘ
ܠܐ ܢܟܢ ܡܢ ܦܠܝܬܘܬܐ . ܐܦ ܕܐܝܬ ܡܠܝܠ ܡܢ ܗܪܝܢ ܐܘܟܣܝܕܐ ܕܪܟܘ . ܠܐ
ܗܘܐ ܐܝܪܐ . ܘܠܗܘܬܐ ܕܡܟܘܪܘܬܐ ܕܚܘܡܨܐ ܗܘܝܐ . ܠܐ ܡܘܗܪܐ ܠܐ
ܝܕܘܥܐ ܡܢ ܢܝܫܐ ܝܕܘܥܝܬܐ . ܡܥܢܝܬܐ ܠܗ ܡܦܠܚܬܐ ܕܡܠܟܐ ܡܢ ܟܪܟܐ
ܕܠܝܪܐ ܡܐ ܠܗܘܦܐ . ܣܠܩ ܟܪܟܐ ܕܦܪܕܐ . ܠܐ ܢܘܦܠܐ ܡܢܝܢܐ . ܕܡܢܝܢ
ܠܦܠܟܐ ܟܢܬܗ .

١٠ - ٢ - ܠܒܪܐ ܕܡܘܪܟܬܐ ܘܦܠܝܣܡܘܣܬܐ ܠܐ ܚܘܡܨܐ ܗܘܝܐ :

ܡܟܠܠ ܡܘܪܟܬܐ ܣܓ ܠܒܪܐ ܕܝܢܐ ܠܐ ܐܘܪܟܝܘܬܐ ܕܚܘܡܨܐ ܗܘܝܐ .
ܟܪܟܝܢ ܡܟܘܪܘܬܐ ܕܟܢܝܐ ܟܘܪܝܐ ܘܢܝܫܘܬܐ . ܘܡܩܝܡܢܘܬܐ ܕܐܘܪ ܠܝܘܬܗ
ܟܪܟܬܐ ܘܦܬܓܡܐ . ܢܟܪ ܐܘܟܣܝܕ ܠܦܪܘܐ ܘܦܪܡ ܠܐ ܡܦܘܡܐ ܗܘܝܐ ܐܦ
ܕܝܬ ܡܠܝܠ ܡܝܗ ܠܐ ܡܢܐ . ܘܡܦܠܐ ܠܐܟܘܝܐ ܡܣܠܬܢܐ . ܐܣܝ ܕܡܢܝܢܠܘ
ܠܡܘܪܐ ܡܢܝܢܠܘܐ ܕܢܦܫܐ ܘܝܪܩܐ .

ܡܦܠܝܠ ܕܡܦܫܐ ܗܝܕܪܘܓܝܢܐ (Ph) ܠܒܪܐ ܝܠܦܢܐ ܟܝܠܦܢܬܐ ܥܠ ܕܒܪܬܐ ܘܦܫܘܬܐ
ܕܡܘܪܟܬܐ . ܟܕ ܦܠܝܣ ܠܡܦܠܚܢܘܬܐ ܕܝܪܩܐ ܘܚܡܪܐ ܠܐ ܟܘܪܟܐ ܢܟܦܘܪܝܬܐ . ܟܝܢ
ܡܦܠܚܢܘܬܐ ܕܦܘܠܣܢܐ ܕܐܘܒܟܐ (ܦܝܢܘܦܬܠܝܢ) . ܘܡܝܢܝܢܐ ܕܡܝܟ ܕܡܦܫܐ
ܗܝܕܪܘܓܝܢܐ ܡܢ ٧ ܦܠܝܣ ܐܘܐ ܐܘܒܟܐ ܠܚܘܡܨܐ ܚܡܪܐ ܠܝܪܩܐ . ܘܐܘܐ ܡܚܪܐ ܡܢܝܬܐ
ܕܘܪܒܐ ܕܝܢܐ ܠܐ ܟܘܪܟܐ ܢܟܦܘܪܝܬܐ . ܘܐܘܐ ܡܚܪܢܐ ܡܦܠܚܢܗ ܠܣܘܡܩܐ ܡܢ ܡܢܝܗ
ܘܟܣܪܬܐ ܟܡܟܢܗ . ܘܐܘܐ ܡܚܪܐ ܕܒܪܬܐ ܕܡܘܪܟܬܐ . ܘܐܝܟܢ ܕܝܣܟ ܕܡܦܫܐ
ܗܝܕܪܘܓܝܢܐ ܡܢ ٧ . ܡܟܝܠܟ ܝܪܩܐ ܠܚܡܪܐ ܟܡܟܟܪܝܘܬܐ ܕܐܘܒܟܐ ܕ (ܦܝܢܘܦܬܠܝܢ)
، ܟܕ ܐܝܟ ܘܪܒܐ ܕܝܢܐ ܠܐ ܟܘܪܟܐ ܢܟܦܘܪܝܬܐ . ܘܐܘܐ ܡܚܪܢܐ ܟܘܢܐ ܕܡܢܐ ܝܠܦܗ ܡܢ
ܟܘܪܟܐ ܟܡܟܢܬܐ ܘܡܠܝܢܗ . ܘܟܘܐ ܝܪܩܐ ܦܫܝܣ ܡܘܪܟܬܐ .

PH ܟܝܒܪ ܡܢ ٧ ܕܒܪܐ ܡܘܪܟܬܐ
ܝܪܩܐ ⇄ ܐܘܒܟܐ ܕܦܝܢܘܦܬܠܝܢ ⇄ ܚܡܪܐ
PH ܒܨܪ ܡܢ ٧ ܦܫܝܣ ܡܘܪܟܬܐ

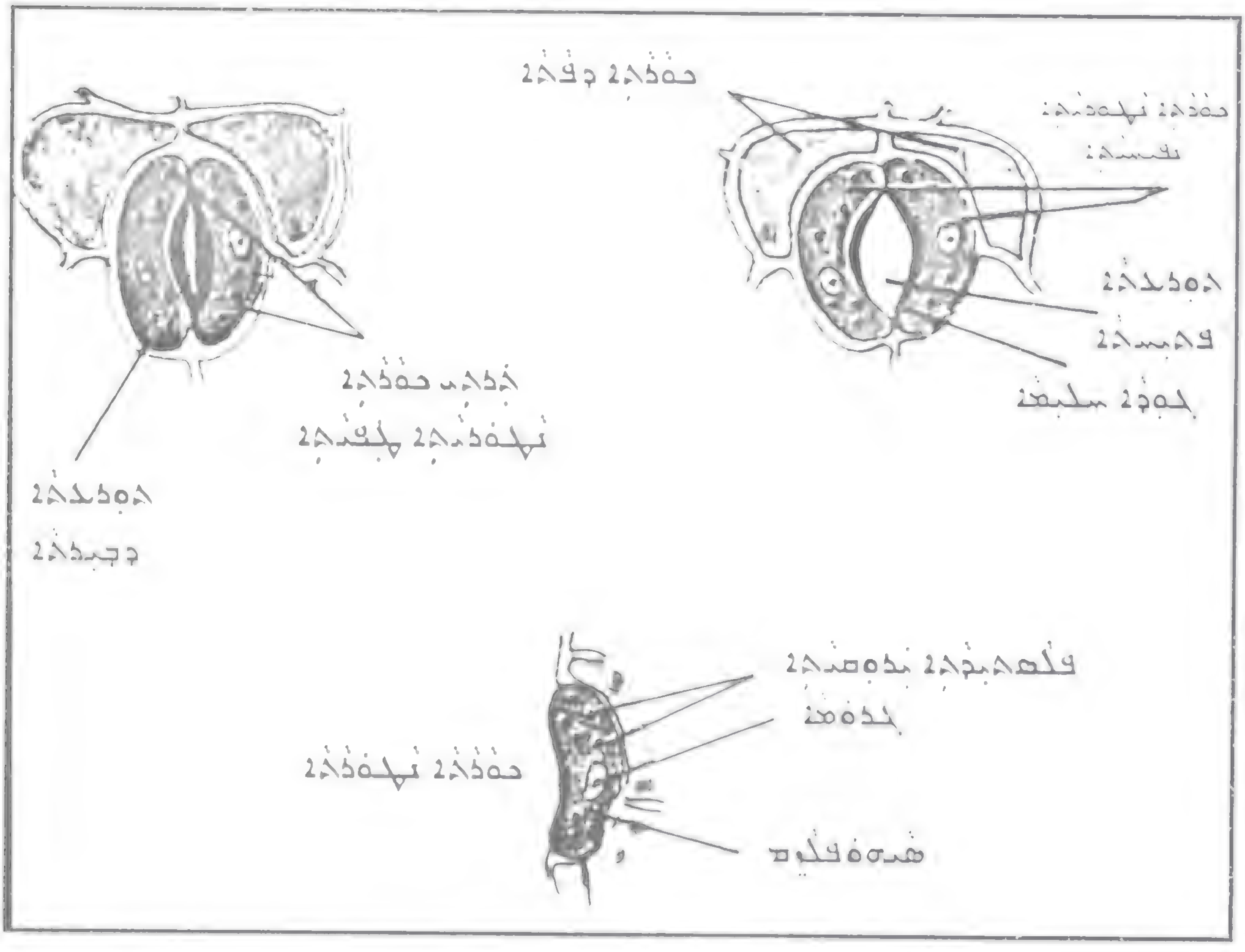
ܨܘܪܬܐ ٣ - ١)

[illegible]

ܕܥܠܝܗ ܕܟܡܐ ܠܠܝܐ ܠܗܘܐ ܟܪܝܐ.

١٠ - ٣ - ܫܘܚܠܦܐ ܕܦܘܬܚܐ ܘܐܚܝܕܐ ܕܦܘܡ̈ܐ :

ܦܬܝܚܘ ܘܐܚܝܕܘܬܐ ܕܦܘܡ̈ܐ . ܗܘ ܕܒܥܒܕܐ ܡܢ ܟܠ̈ܝܬܐ ܢܛܘܪܬܐ ܘܐܝܟ ܒܪܝܐ . ܡܢ ܐܚܝܕܘܬܐ ܕܦܘܡ̈ܐ ܗܘ ܕܒܥܒܕܐ ܒܥܒܕܐ ܕܠܠܝܐ .



ܨܘܪܬܐ (٣ - ١) ܙܘܓܐ ܕܟܠ̈ܝܬܐ ܢܛܘܪܬܐ ܥܡ ܦܘܡܐ ܕܦܬܝܚܐ

ܘܫܘܚܠܦܐ ܒܪ̈ܝܐ ܟܡܝܘܬܐ ܕܟܠ̈ܝܬܐ ܢܛܘܪ̈ܬܐ ܘܦܬܝܚܘܬܐ ܐܘ ܐܚܝܕܘܬܐ ܘܟܠ̈ܝܬܐ ܢܛܘܪ̈ܬܐ ܡܦܠܚ ܐܝܟ ܐܘܪܚܐ ܕܒܪܝܐ . ܘܡܦܠܚ ܐܘܪܚܐ .

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

١١ - [illegible] :

[illegible]
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]

[illegible]
[illegible]
[illegible]
[illegible]

ܕܡܘܫܠܡܬܐ ܕܐܝܬܝܗ̇ ܚܕܐ ܘܡܬܘܣܦܐ ܥܠܫܢܬܐ . ܒܡܬܒܡܬ ܕܐܢܐ ܚܕܐ
ܐܡܦܪܘ̈ ܐܡܒܡܐ . ܘܠܗ ܚܕ ܐܝܡܐ ܐܝܟ ܕܐܗܐ . ܒܥܠܝܗ ܕܢܝܠܢܐ
ܘܒܝܕܬܐ ܒܡܘܫܠܡܬܐ . ܡܦܝܫ ܕܡܬܚܐܝܕ ܚܕ ܡܘܦܩܐ ܕܡܬܚܠܕܐ . ܐܝܢܐ
ܡܦܝܫ ܥܠܝܫܐ ܚܕ ܡܕܒܪܢܐ ܕܡܬܚܠܕܐ . ܘܡܡܠܠܐ ܕܐܗܐ ܒܠܗ ، ܕܘܝܕܐܐ
ܒܡܘܫܠܡܬܐ ܒܝ ܠܒܘܪܬܐ ܒܠܗ ܕܢܐ ܡܢ ܘܝܕܐ ܒܡܬܘܣܦܐ ܕܥܠܝܫܐ ܠܗܘ̈ܢܐ
ܟܠ ܕܐܗܐ ܕܒܘܬܐ ܕܫܘܬܐ ܡܢܐܠܗܘ، ܗܕܡܐ ܢܦܝܫܘܬܢܐ ܕܝܠܢܐ .
ܘܐܘܪ ܠܢܘܬܐ ܫܬܝܫܬܐ . ܒܝܬܐ ܕܡܬܠܒܟܬܐ ܕܡܘܙܕܘܬܐ ܕܟܘܪܬܐ
ܒܐܘܪܒܝܠܝܢ . ܘܦܪܘܦܫ ܡܢ ܗܪܢܘܬ ܐܘܪܒܝܠܐ ܕܦܪܟܘܗ̇ . ܡܦܠܠ ܠܐ
ܡܠܢܘܬܐ ܕܥܠܝܫܐ ܠܗܘ̈ܢܐ . ܐܝܢܐ ܢܦܠܕܠܗܘ، ܚܕ ܗܘܡܐ ܡܢ ܫܘܬܐ
ܠܒܝܬܐ ܕܥܠܝܫܐ ܠܗܘ̈ܢܐ ܢܦܝܫܘܬܢܐ . ܘܡܦܠ ܫܘܚܠܦܐ ܗܘܦܟܐ ܠܗ
ܫܘܬܐ ܟܠ ܦܪܗܕܐ ܕܐܘܪܒܝܠܝܢ ܘܡܪܢܘܬ ܐܘܪܒܝܠܐ ܕܦܪܟܘܗ̇ . ܡܢ ܠܗ
ܥܠܝܫܐ ܢܦܝܫܘܬܢܐ ، ܐܘ ܥܠܝܫܐ ܠܗܘ̈ܢܐ ܕܠܘܒܡܐ .

١١.١ - ܫܘܚܠܦܐ ܗܘܦܟܐ ܕܦܘܠܚܢܐ :

ܦܪܗܕܐ ܕܐܘܪܒܝܠܝܢ ܠܗ ܠܘܒܡܐ ܕܫܘܬܐ ܘܒܘܪܢܝܬܐ . ܒܪܢܐ ܒܡܘܪܗܒܐ . ܡܦܠܠ ܗܘܝܬܐ ܕܒܫܘܬܐ ܕܦܪܗܕܐ ܒܪܝܬܐ . ܐܝܢܐ ܠܗ ܫܘܬܐ ܠܒܘܪܢܝܬܐ . ܐܘܗܐ ܕܫܘܬܐ ܗܘܐ ܠܒܘܪܬܐ ، ܒܟܠܬܐ ܕܘܝܕܐ ܕܫܠܒܘܬܐ ܕܘܡܘܪܢܗ . ܠܒܪܐ ܡܦܠܬܐ ܕܐܘܪܒܝܠܝܢ ܠܒܘܪܬܐ ܕܫܒܝܬܐ ܡܢ ܥܠܝܫܐ . ܚܕ ܒܘܝܠܐ ܢܗܡܐ . ܘܡܬܐܠܗܘ، ܐܝܢܐ ܫܘܬܐ ܘܡܢܝܫ ܦܘܠܚܢܐ ، ܒܠܒܬܐ ܠܐܗܐ ܙܒܘܬܐ ܒܝܕ ܦܒܝܢܘܬܐ ܡܢܝܫ :

ܐ - ܥܠܝܫܘܬܐ ܕܠܘܒܡܐ . ܘܫܘܬܐ ܕܫܘܬܐ ܒܝܢ ܗܕܐ ܥܠܝܫܐ ܒܠܢܐ ܘܦܫܘܢܐ ، ܐܝܟ ܕܝܠܗ ܐܢܝܫܘܬܐ ܒܦܘܠܚܢܐ ܡܥܠܝܫܐ .

ܒ - ܦܘܪܐ ܕܐܘܪܒܝܠܝܢ ܕܫܘܪܪܐ ܠܗܘܢ . ܟܕ ܫܒܝܒ ܕܡܐ ܙܒܘܬܐܢܐ ܢܦܝܫܘܬܢܐ ، ܡܬܚܫܚܬܐ ܠܦܠܚܬܐ ܕܐܘܪܒܝܠܝܢ ܘܡܪܢܘܬ ܐܘܪܒܝܠܐ ܕܦܪܟܘܗ̇ ܐܝܟ ܕܝܠܗ ܐܢܝܫܘܬܐ ܠܗ ܦܘܠܚܢܐ ܫܠܡܐܢܐ .

ܓ - ܒܪܐܠܗܘ، ܠܗ ܚܕܡܐ ܦܘܠܚܢܐ ܫܠܡܐܢܐ ܐܝܟ ܦܘܠܚܢܐ ܕܫܝܢܐ ، (Lygworm) ܡܦܘܫܢܝܐ ܒܪܢܝܐ . ܘܒܠܗ ܦܘܫܩܐ ܡܢ ܦܘܡܐ ܕܒܠܕܐ ، ܡܦܝܕܝܢ ܠܥܠܝܫܐ ܢܦܝܫܘܬܢܐ .

ܘܒܗ ܡܬܠܒܟܐ ܕܪ̈ܕܝܐ . ܒܚܘܪ ܕܗܘ ܣܝܡܐ ܠܗ ܠܬܪ̈ܬܝܢ ܢܫܡ̈ܬܐ ܘܗܠܝܢ ܠܗ ܒܟܠ ܕܘܟܐ ܐܝܬ ܒܗ ܡܥܒܪܢܘܬܐ ܟܠ ܐܚܪ̈ܢܐ ܕܝܡܬܐ ܥܠ ܡܫܟܢܝܢ . ܠܐ ܡܟܝܠ ܡܢܬܐ ܕܡܫܬܘܬܦܐ ܥܡ ܡܫܡܫܢܘܬܐ ܕܐܘܟܣܓܝܢ ܘܦܬܓܡܐ . ܡܢܗܝܢ . ܐܝܟ ܗܢܐ ܕܐܝܬ ܒܗ ܣܝܡܐ ܕܡܛܠ ܗܢܐ ܕܝܠܗ̈ܝܢ . ܡܫܡܫܢܘܬܐ ܡܫܘܫܛܐ ܕܢܫܡܐ . ܘܗܠܝܢ ܡܠܝܢ ܠܡܫܡܫܢܘܬܐ ܕܫܘܚܠܦܐ ܕܘܟ̈ܝܐ . ܡܢ ܡܘܫܐ ܕܡܝ̈ܐ ܕܒܗ ܒܬܪ ܗܠܝܢ ܡܫܒܠܐ ܐܝܟ ܕܝܢ ܡܫܡܫܢܘܬܐ ܠܒܪ ܡܢ ܡܘܕܥܢܘܬܐ . ܠܢܫܡ̈ܬܐ ܠܗܘ̈ܕܝܐ ܕܐܝܬ ܡܢ ܡܢܗܘܢ . ܘܡܕܡ ܡܛܘܐ ܠܐܘܟܣܓܝܢ ܘܦܬܓܡܐ .

ܡܫܡܫܢܘܬܐ ܕܝܠܗ ܡܢ ܟܠ ܚܕܐ ܕܡܢܗܝܢ . ܒܡܘܠܕܐ ܕܝܠܗܝܢ . ܐܝܟ ܡܢܬܐ ܕܐܘܟܣܓܝܢ . ܐܝܟ ܦܬܓܡܐ ܡܫܘܚܠܦܐ ܒܡ̈ܝܐ . ܡܫܡܫܢ ܐܦ ܐܝܟ ܒܫܘܚܠܦܐ ܘܘܟ̈ܝܐ . ܒܡܬܘܡܝܘܬܐ ܡܢ ܠܗ ܕܐܝܬ ܡܢܬܐ . ܐܦ ܐܝܟ ܗܠܝܢ ܕܐܝܬ ܚܘܫܒܐ ܕܡܘܠܕܐ . ܐܝܟ ܦܬܓܡ̈ܐ . ܒܫܘܚܠܦܐ ܐܝܟ ܕܡܢܗܝܢ ܡܫܡܫܢܘܬܐ ܕܐܝܬ ܠܗܝܢ ܡܫܘܚܠܦܘܬܐ . ܡܢ ܡܫܡܫܢܘܬܐ ܕܡܢ . ܒܢܫܡ̈ܬܐ ܕܘܟ̈ܝܐ ܡܫܘܚܠܦܢܝܬܐ .

١٠٢ - ܡܫܘܚܠܦܐ ܕܘܟ̈ܝܐ ܠܘ ܢܫ̈ܡܬܐ :

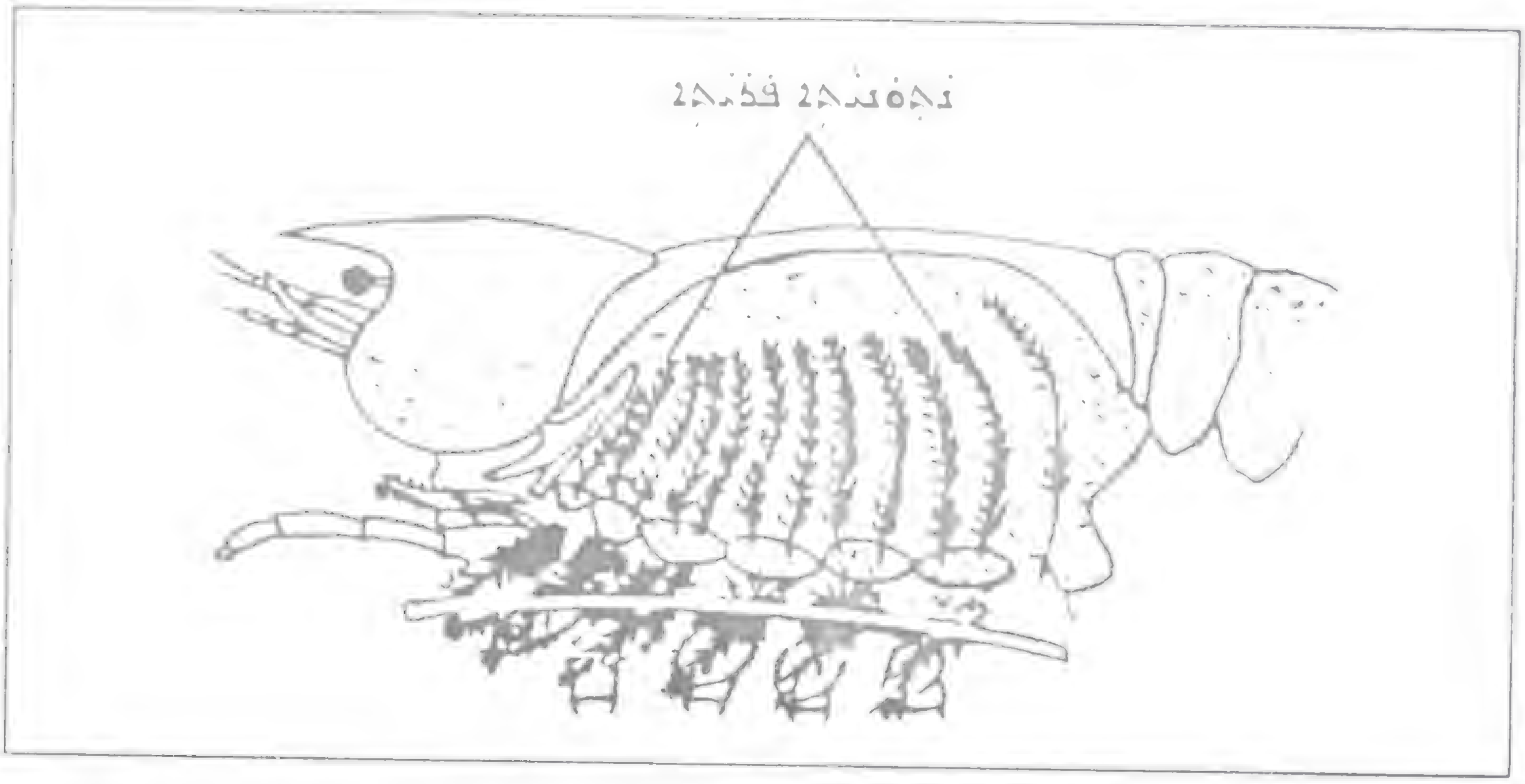
ܠܐ ܟܠܗ ܦܬܓܡܐ ܡܫܘܚܠܦܐ ܕܘܟ̈ܝܐ . ܡܢ ܐܘܪܚܐ ܕܢܫ̈ܡܬܐ . ܘܗܘ ܐܝܟ ܠܡܘܠܕܐ ܕܐܝܬ ܠܗ ܒܗܝܢ . ܕܦܬܓܡ ܚܕ ܕܡܫܒܠܐ ܡܫܡܫܢܐ . ܡܢܗܝܢ ܠܡܘܕܥܐ ܡܘܢܗ . ܘܡܛܠ ܠܡܘܕܥܐ ܠܗ ܕܝܠܗ . ܘܗܘܐ ܡܫܡܫܢܐ ܡܢܗܝܢ ܐܝܟ ܡܢ ܡܢܗܘܢ . ܥܠ ܡܫܘܚܠܦܐ ܕܘܟ̈ܝܐ ܡܫܘܚܠܦܢܝܬܐ . ܐܝܟ ܡܢܗܝܢ ܗܘ ܕܐܝܬ ܠܗܘܢ ܡܢ ܗܝ ܠܗ ܗܘܐ . ܘܡܫܬܟܚܢ ܡܢ ܗܘ . ܢܫ̈ܡܬܐ ܡܢܗܝܢ ܐܝܬ ܘܡܫܘܚܠܦܢ . ܘܢܫ̈ܡܬܐ ܐܚܪ̈ܢܝܬܐ . ܡܢ ܡܕܡ ܕܐܝܟ ܗܘܐ ܡܫܡܫ ܒܗ .

ܘܡܫܬܟܚܢ ܢܫ̈ܡܬܐ ܒܝܘܡܬܐ ܠܗܘܢ ܕܡܫܡܫܝܢ . ܠܡܢܐ ܕܫܘܚܠܦܐ ܕܘܟ̈ܝܐ . ܒܝܘܡܬܐ ܡܫܘܚܠܦܢܝܬܐ ܡܫܒܠܢܝܬܐ . ܕܐܝܟ ܐܫܟܚܢ ܡܫܘܚܠܦܐ ܒܡܫܡܫܢ ܡܢܗܘܢ :

2 . ܢܫ̈ܡܬܐ ܦܛ̈ܝܬܐ (Pinnant Gills)

ܘܐܝܟ ܕܐܝܬ ܡܫܡܫܢܐ ܡܢ ܢܘܦܐ ܦܛܝܪ ܡܫܘܚܠ (ܐܫܟܚܐ ٣ - ٢) . ܘܒܗ ܡܠܦܢܐ ܡܠܬܐ ܕܐܝܬ ܐܝܟ ܗܠܝܢ ܡܫܡܫܢ . ܢܦܠ ܠܗ ܚܕܐ

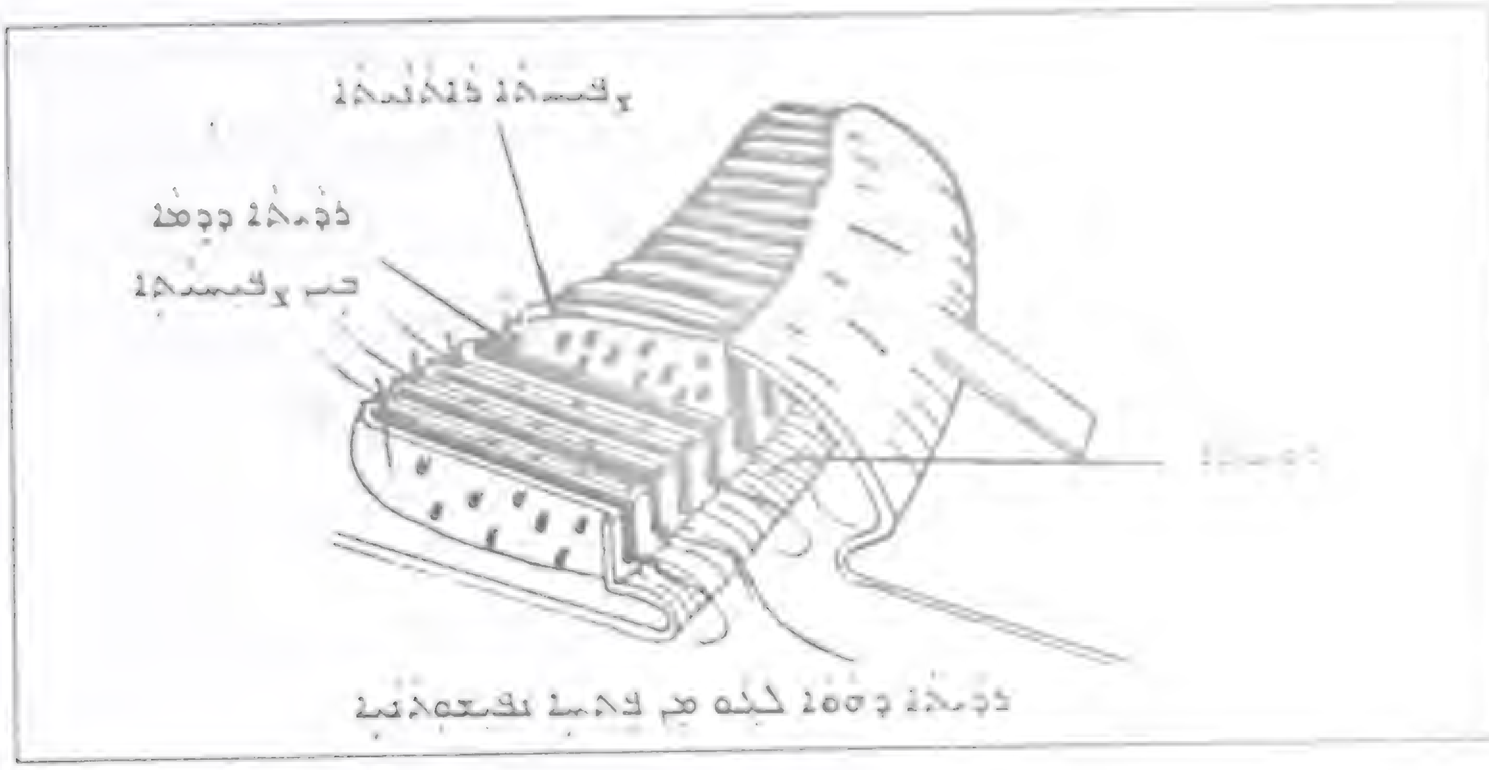
ܪ̈ܘܚܬܐ ، ܒܪ̈ܓܠܘܗܝ ܕܘܪ̈ܟܐ ܒܟܦܝܬܐ ܙܥܘܪܬܐ . ܡܟܟܪܝ ܚܕܟܡܐ ܢܫܘܦܐ
ܒܘܡܝܣܗ . ܚܕ ܡܫܬܘܠܐ ܡܢܐ . ܐܝܟ ܠܪܘܚܬܐ ܡܢ ܓܝܒܐ ܒܫܟܪܐ ،
ܘܦܠܛ ܡܢ ܓܝܒܐ ܠܡܕܡܢܐ . ܘܒܐܘܪܚܗ ܗܘܝܐ ܡܢܐ ܐܘܫܓܝܢ . ܘܫܡܠ
ܚܫܘܒܐ ܕܒܪܒܘܝܢ ܡܕܝܢܬܐ ܠܗ ܕܡܐ . ܗܘ ܕܪܕܐ ܠܗ ܦܪܘܩܐ ܕܢܫܘܡܬܐ



ܨܘܪܬܐ (٣ - ٢) ܢܫܘ ܢܫܬܐ ܦܪܝܬܐ ܠܗ ܡܪܓܠܬܐ ܬܚܬ ܡܪܡܬܐ
ܕܗܘܡܐ ܡܫܠܝܐ ܡܢ ܕܘܪܟܐ

٢ - ܪ̈ܐܬܐ ܟܬܒܢܝܬܐ (Book Lungs) :

ܐܝܬ ܐܢܝܢ ܗܘܝܢ ܠܗ ܠܗܠܝܢ (ܥܩܪ̈ܒܐ ܘܠܘܠܝܢ) ܘܢܦܠܝܢ ܥܢܟܒܝܬ
ܥܠ ܚܕܐ ܓܝܒܐ ܕܟܝܣܐ ܒܪܬܝܬܐ . ܡܢ ܡܫܬܡܫܢܘܬܐ ܕܒܪܢܫܐ . ܒܨܘܪܬܐ
ܕܚܕܐ ܟܬܒܐ . ܚܕ ܒܬܪ ܓܒܐ . ܫܒܝܒ ܟܬܒܐ ܕܪܐܬܐ ܟܬܒܝܬܐ . ܥܠ ܦܬܘܪܐ
ܘܪܫܐ ܒܨܘܪܬܐ . ܒܐܝܢܝܘܬܐ ܕܪܘܦܐ ܐܘܦܝܐ . ܪܕܐ ܠܗܘܢܝ ܕܡܢܐ (
ܨܘܪܬܐ ٣ - ٣) . ܐܝܟ ܗܘܐ ܠܪ̈ܐܬܐ ܟܬܒܝܬܐ ܒܐܘܪܚܐ ܕܚܕ ܦܬܚܐ ܒܪ̈ܐܬܐ
. ܢܦܠ ܠܗ ܟܝܣܐ ܕܪܐܬܐ ܡܘܪܟܐ ܕܦܬܚܐ ܕܦܪܢܣܘܬܐ . ܘܗܕܐ ܦܝܫ ܗܘܐ
ܡܘܪܟܐ ܡܢ ܕܡܐ ، ܘܒܪܐ ܠܡܫܠܦܐ ܗܘܦܐ ܕܠܒܗ .



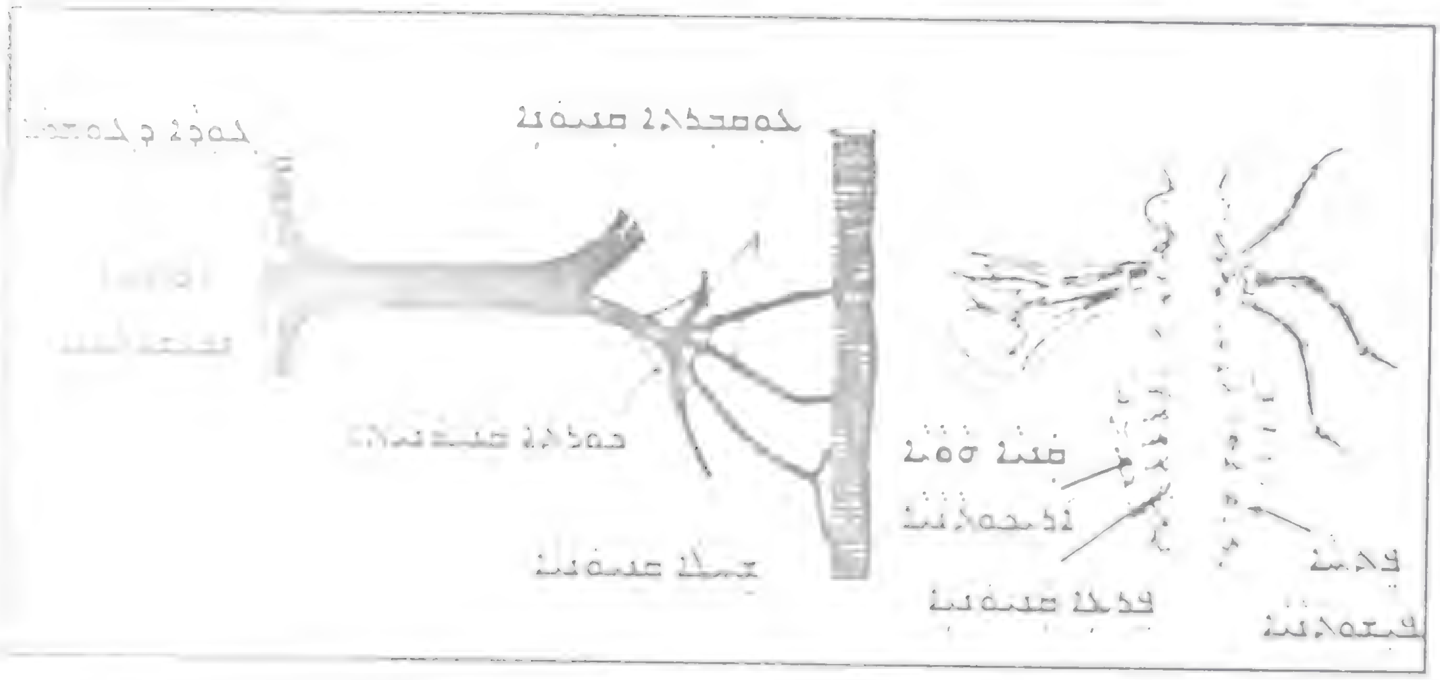
ܨܘܪܬܐ (٣ ـ ٣) ܪܐܬܐ ܟܬܒܢܝܬܐ

٣ . ܩܢܝܐ (Tracheae) :

ܢܫܡܝ ܪܚܫܐ ܘܣܓܝܐܐ ܡܠܩܕܐ ܐܪܥܢܝܬܐ (ܡܫܘܝܢ ܪܓܠܐ Isopoda) ܒܡܫܚܘܬܐ ܕܐܐܪ ܠܦܐ ܡܕܡܕܪܐ ܡܢ ܐܢܫܐ ܐܘ ܡܢܐ ܕܡܝܐ ܡܣܒܪܐ ܡܢ ܠܗܘܢ ، ܒܠܫܘܢܝܬܐ ܚܠܘܦܝܬܐ ܕܡܫܪܝܬܐ . ܦܠܚܝ ܠܡܫܡܫܘ ܘܡܠܠܝ ܠܦܪܨܘܦܗܘܢ ، ܥܠ ܕܗܘܐ ܒܫܘܚܠܦܐ ܦܬܝܚܐ ܐܡܝܢܐܝܬ . ܡܢܝܢܐ ܡܛܪܐ ܕܡܢܝܢܐ ܠܟܘܪܐ ܠـ (١ ܡܠܡ) . ܘܦܬܝܚ ܥܠ ܢܝܫܐ ܕܠܘܩܒܠ ܠܗ ܪܚܫܐ ܡܢ ܠܗ ܒܪܚܫܐ ܢܦܠܝ ܥܠ ܗܕܐ ܠܢܫܡܬܐ ܕܐܘܪܐ ܡܟܪܗܐ ، ܦܬܚܝ ܡܣܩܘܡܐ ܒܡܢܝܢܐ ܐܘ ܦܬܝܚܐ ܢܫܡܘܬܢܝܐ (Spiracle) . ܡܫܘܕܥ ܐܢܐ ܦܬܝܚܐ ܒܟܪܣܐ ، ܐܘ ܡܫܘܬܦܢܝܬܐ ، ܕܡܬܠܒܫܝܢ ܒܫܘܚܠܦ ܗܘܐ . ܘܠܡܫܠܡܬܐ ܕܣܝܡܝܢ ܠܗܘܢ ܐܦ ܐܢܫܘܬܐ ܒܡܘܫܚܬܗܘܢ .

ܒܪܐ ܡܫܠܡܢܘܬܐ ܒܫܘܠܚܦܐ ܕܢܫܡܬܐ . ܒܡܘܫܚܘܬܐ ܕܒܘܣܡܐ ܕܟܬܢܝܬܐ ܕܠܩܢܝܬܐ . ܥܒܕܝ ܡܢܐ ܠܗ ܠܘܩܒܠ ܕܢܫܡܬܐ ܐܪܥܢܝܬܐ ܘܡܝܢܝܬܐ . ܘܐܝܬ ܠܗܘܢ ܠܡܥܒܕ ܪܚܫܐ ܡܢ ܩܢܝܐ ، ܘܠܗ ܪܓܠܐ ܠܥܠܝܘܗܝ (ܨܘܪܬܐ ٣ ـ ٤) . ܘܐܝܬ ܦܪܕܐ ܡܢܝܢܐ ܐܝܬ ܠܗܝܢ ܪܚܫܐ ܡܫܡܫܝܢ ܡܢ ܚܕ ܩܢܝܐ . ܡܢ ܩܢܝܐ ܡܕܡܐ ܠܘܩܒܠ ، ܘܒܗܘܢ ܢܫܡܬܐ ܩܢܝܐ ܡܫܡܫܢܐ ܢܫܡܬܢܝܐ . ܡܢܝܢܐ ܡܛܪܐ ܕܡܢܝܢܐ ܠـ ١ ܡܝܟܪܘܡܝܛܪ ،

ܘܒܕܐ ܬܘܣܠܦܐ ܗܘܦܟܐ ܡܢ ܠܗ ܠܗܘܢܝܫ ܒܝܘܡܬܐ ܒܠܕܬܐ ܡܢܝܢܐ ܠܝܡܘܬܐ ܕܠܗܘܒܐ . ܠܗ ܡܠܘܬܐ ܒܡܢܝܢܐ . ܡܘܕܝ ܡܢܘܢܐ ܠܒܘܠܕܐ ܕܠܘܡܐ . ܘܒܠܐ ܒܘܡܒܪܬܢܐ ܕܬܘܒܥܐ ܡܣܕܪܢܐ ܠܣܠܝܐ ܡܝܬܝܘܬܐ ܕܝܘܡܐ ܒܝܢ ܗܘܐ ܘܒܘܕܬܐ . ܐܝܟ ܕܒܠܗ ܢܡܫܘܬܐ ܒܕܒܢ ܡܢ ܫܘܬܐ ܐܣܕܢܬܐ . ܦܬܐ ܣܘܝܬܐ ܡܠܝܬܐ ܕܐܣܕܝܬܐ ܒܡܫܘܢܐ ܒܡܕ ܒܣܠܐ ܕܡܦܝܕ ܠܬܘܣܠܦܐ ܗܘܦܟܐ . ܒܝܢ ܒܕܒܢܐ ܕܗܘܡܐ ܕܐܘܕ ܠܟܐ ܡܢܢܐ ܡܠܐ ܒܗܘܐ ܘܒܘܕܬܐ .



ܨܘܪܬܐ (٣ ـ ٤) ܐܘܪܚܬܐ ܕܒܪܘܬܢܐ [illegible]
ܘܐܡܠܐ ܡܒܘܢܐ ܒܝܢ ܠܒܐ)

ܒܕܐ ܐܗܐ ܡܬܘܕܘܬܐ ܕܬܘܣܠܦܐ . ܠܗ ܢܝܫܐ ܕܠܗܘܕܐ ܒܢܦܫܬܐ . ܐܝܠܐ ܠܗ ܢܝܫܐ ܠܒܘܕܐ ܐܝܟ ܡܢܝܐ . ܗܕܐ ܡܢ [illegible] ܕܗܘܐ ܠܗ ܡܢܝܐ . ܘܒܕܝܐ [illegible] ܢܘܒܝܐ ܡܝܠܐ ܡܥܘܕܝܐ [illegible] ܘܒܠܕܝܐ ܕܕܘܫܬܐ ܕܦܕܝܐ . [illegible] ܕܦܬܚ ܢܒܪܘܬܢܐ ܝܕܥܐ . [illegible] ܠܗ ܦܬܚ ܒܕܝܐ .

ܘܬܘܦܩܬܐ ܠܟܐ ܕܡܕܝܢ . [illegible] ܕܕܢܬܐ ܒܬܒܢܬܐ ܘܡܢܝܐ ܒܟܡ ܣܕܝܐ . ܐܝܟ [illegible] ܡܢܢܬܐ ܠܗ ܢܝܫܐ [illegible]

ܘܗܠܝܢ ܕܘܟܐ . ܗܕܐ ܡܢܝܐ ܒܕܘܟܐ ܕܡܢܝܐ ܕܡܢܝܐ ܡܫܚܠܦܐ . ܘܗܕܐ
ܡܫܚܠܦܐ ܡܘܢܐ . ܐܝܟ ܗܘܐ ܕܡܢܝܐ ܘܡܢܐ .



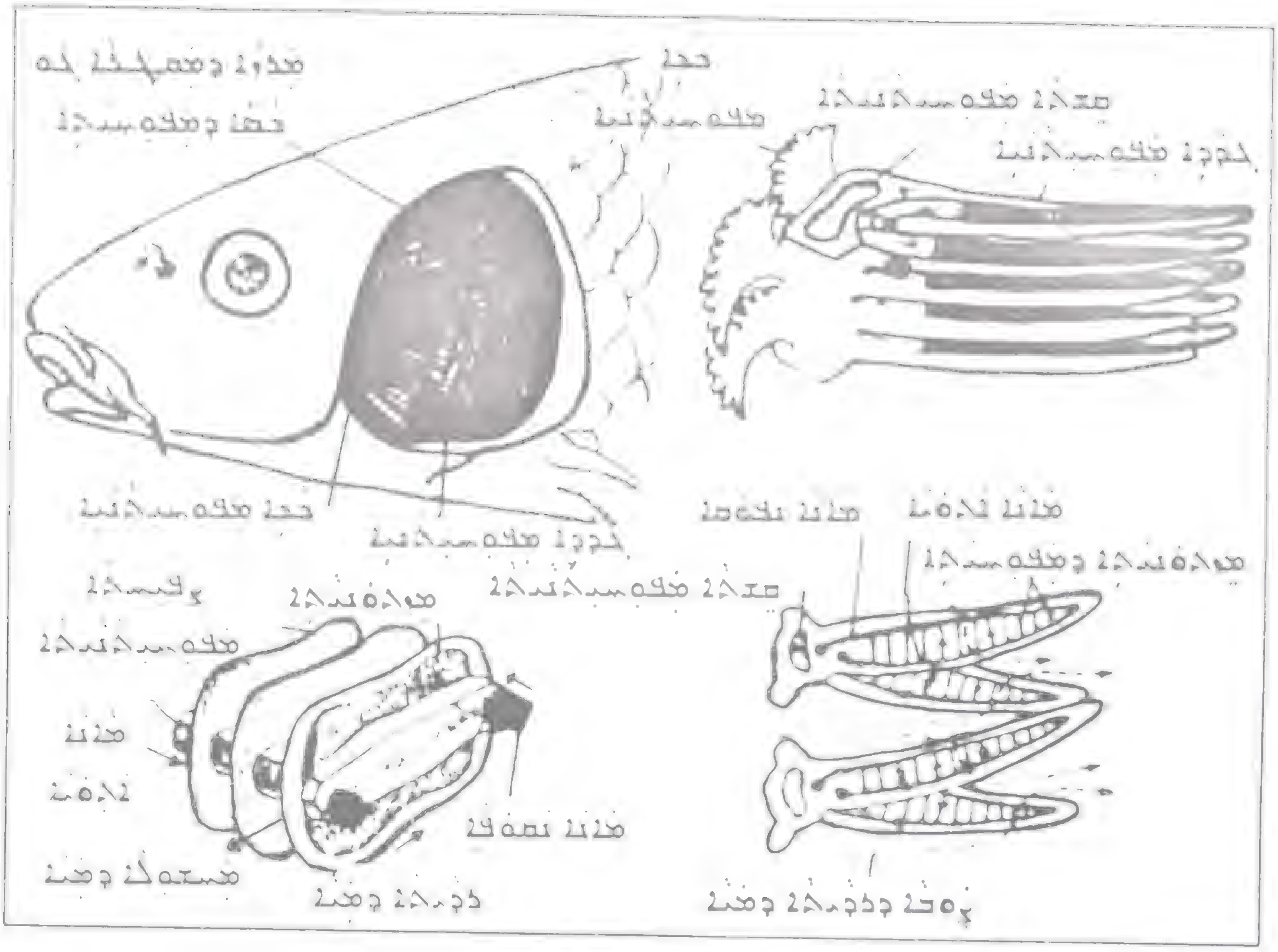
ܨܘܪܬܐ (٣ . ٥) ܡܦܘܣܢܘܬܐ ܚܕܢܝܬܐ ܠܐܝܠܢܐ
ܐܝܠܢܐ ܕܡܫܚܠܦܐ ܕܐܢܫܐ .

11 . 3 - ܬܟܫܦܘܬܐ ܒܗ ܝܢܘܩܐ ܦܘܪܫܢܝܬܐ :

١١ . ٣ . ١ - ܬܟܫܦܘܬܐ ܒܗ ܦܘܪܫܢܝܬܐ ܚܕܢܝܬܐ :

ܡܫܘܚܠܦܐ ܡܢܐ ܢܘܢܐ ܡܢ ܐܝܟ ܦܘܪܫܢܝܬܐ ܚܕܢܝܬܐ ܒܝܕ ܐܢܫܘܬܐ ،
ܘܒܕܡܝܐ ܡܢܐ ܠܗܕܐ ܐܕܫܐ ܕܟܠܐ ܠܝܗ ܢܘܢܐ ܡܕܘܟܬܐ ܐܝܟ ܒܘܡܒܐ
ܘܒܩܛܠܐ ܕܡܢܐ ܘܢܘܢܐ ܠܕܡܐ ܐܝܟ ܘܒܝܕܐ ܘܒܕܘܟܬܐ . ܘܠܗܕܐ ܒܕܐ
ܕܡܫܠܡܐ ܗܢܐ ܡܢܝܐ ܗܕܐ ܐܕܫܐ ܝܡ ܡܢܐ ܘܡܦܘܣܢܘܬܐ . ܘܟܠܐ ܠܝܗ
ܡܫܘܚܠܦܐ ܐܘ ܦܪܫܐ ܬܟܫܦܘܬܐ ܬܚܘܡܝܬܐ (ܡܦܘܣܢܝܬܐ) ، ܒܝ
ܠܗܕܐ ܡܢܐ ܒܚܕܐ ܐܘ ܠܢܘܟܐ ܒܝ ܐܝܟ ܠܐܕܫܘܬܗ . ܟܠ ܝܘܡܐ
ܕܡܦܘܣܢܘܬܐ ܗܘ ܕܡܫܬܚܠܦ ܒܡܫܘܚܠܦܐ ܕܢܘܢܐ ܡܢ ܚܘܕܐ ܡܕܡܢܐ
ܡܕܡܐ ܢܦܠܐ ܩܢܝܐ ܕܡܦܘܣܢܘܬܐ ܒܗ ܢܘܢܐ ܠܕܡܝܢܐ . ܟܠ ܗܕܐ ܠܒܢܝܐ
ܕܕܫܐ ܒܩܢܝܐ ܕܠܘܚܝܬܐ . ܘܗܘܝܐ ܕܕܝܡܬܐ ܠܗ ܫܠܝܠܘܬܐ
ܡܦܘܣܢܝܬܐ ܒܕܡܝܐ ܡܦܘܣܢܝܬܐ ܠܕܡܝܐ . ܫܢܝܐ ܐܘܐ ܒܡܢܐ ܒܝܕ
ܒܡܢܐ ܡܫܠܡ ܒܩܕܡܐ ܕܫܠܝܠܘܬܐ ܡܦܘܣܢܝܬܐ . ܡܫܘܕܥܬܐ ܠܗ
ܡܦܘܣܢܐ ܒܚܕܢܘܬܐ . ܡܢ ܡܕܡܐ ܡܦܘܣܢܝܬܐ . ܘܗܝ ܠܗ ܐܝܟ ܕܡܟܢܐ
ܐܝܟܘܬܐ ܠܕܡܝܐ . ܗܢܝ ܠܐܕܫܐ ܕܡܦܘܣܢܐ . ܘܡܢ ܕܡܘܬܐ ܐܝܟ
ܕܒܝܢܝ ܐܘܟܠܣܐ ܡܢ ܡܕܡܐ . ܐܦ ܐܝܬ ܟܠ ܝܘܡܐ ܕܕܡܘܬܐ ܚܠܝܬܐ
ܘܐܫܬܢܝܬܐ ܐܝܟ ܡܢܝܢܐ ܠܕܘܟܐ ܡܢ ܓܘܫܡܐ ܐܘ ܠܒܪܐ (ܨܘܪܬܐ ٣ . ٦) .

ܘܒܗܕܟܐ ܗܘܝܐ ܡܦܘܚܬܐ ܚܕ ܓܢܒܐ ܢܦܝܫܘܬܢܐ. ܡܬܕܒܠܢܐ ܐܘ
ܡܕܡܝܐ ܢܦܝܫܘܬܢܐ. ܐܝܟ ܚܕܐ ܠܗܘ ܐܚܪܢܬܐ ܕܡܬܕܪ ܓܦܫܚܬܐ ܐܘ
ܠܒܪܐ.



ܨܘܪܬܐ (٣ - ٦) ܡܦܘܚܬܐ ܠܗ ܢܘܢܐ ܓܪܡܝܬܐ

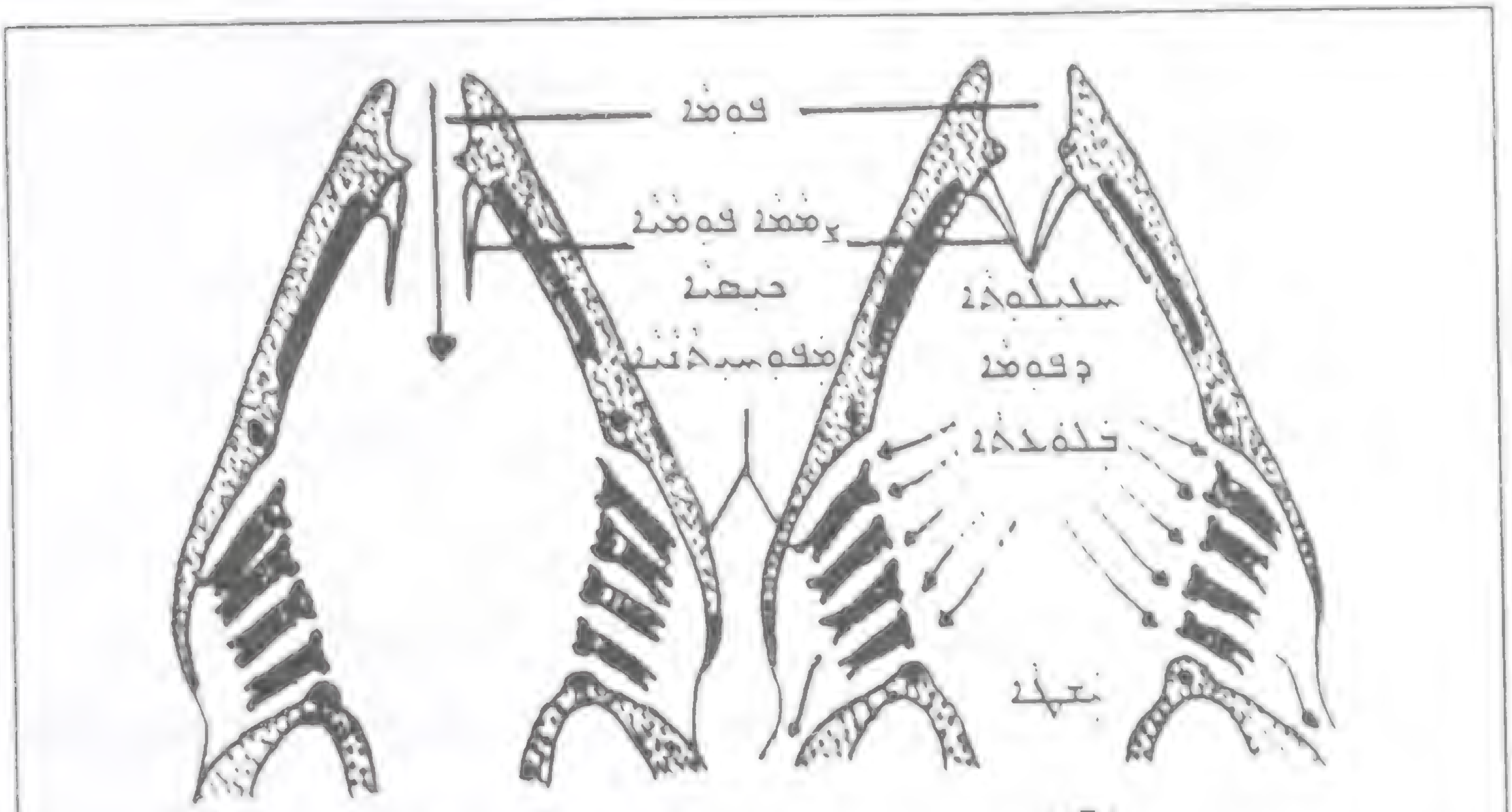
١١ . ٣ . ٢ ـ ܫܘܚܠܦ ܗܘܐ ܠܗ ܢܘܢܐ ܓܪܡܢܝܐ :

ܡܦܠܚ ܡܬܒܪܢܘܬܐ ܕܫܘܚܠܦ ܗܘܐ ܒܝܢܬܐ ܕܡܘܡܝܬܐ ܒܢܘܕ ܫܘܚܠܦܐ ܗܘܦܢܐ ܠܗ ܚܘܬܐ ܡܢܢܐ. ܡܛܠ ܡܫܬܘܚܐ ܡܢܐ ܒܚܕܬܐ ܕܟܕܘܕܢܐ. ܡܘܢܕ ܠܚܘܐ ܒܗܘܐ ܡܕܒܪܐ ܠܗ ܡܢܐ ܠܒܪܐ ܢܦܝܫܘܬܢܝܐ. ܦܬܝ ܠܓܒܝܐ ܡܢܐ ܡܢ ܠܗ ܦܘܡܐ ܠܗ ܢܘܢܐ ܠܓܘ ܚܠܠܘܬܐ ܦܘܡܢܬܐ. ܒܒܠܬܐ ܕܪܘܚܬܐ ܕܐܗܐ ܚܠܠܘܬܐ. ܘܙܘܥܐ ܕܟܦܢܐ ܡܦܘܚܬܢܐ ܠܓܘ (ܠܓܒܝ ܠܒܬܡܐ). ܒܒܪܬܐ ܕܡܦܘܕܐ ܕܠܒܪܝܐ ܕܚܠܘܠܬܐ. ܘܙܘܥܐ ܡܦܘܚܬܢܐ ܠܒܪܐ (ܕܘܫܡܐ ܡܢ ܠܒܬܡܐ). ܡܫܠܝܠ ܘܕܒܐ ܠܗ ܚܠܠܘܬܐ ܡܦܘܚܬܢܝܬܐ. ܘܦܬܝ ܠܓܒܝܐ ܡܢܐ ܒܝܕ

ܗܕܐ ܦܐܫ ܕܣܠܝܠܘܬܐ ܡܦܘܣܚܬܢܝܬܐ ، ܟܐ ܥܒܪܐ ܒܐܘܪܚܝܗ ܡܢ ܒܠܘܥܬܐ ܠܓܕܠܐ ، ܥܠ ܓܠܦܐ ܕܡܦܘܣܚܬܐ . ܘܥܠܒܬܐ ܥܠܗ ܕܣܠܝܠܘܬܐ ܕܦܘܡܐ ، ܥܠܗ ܫܠܝܐ ܘܗܘܝܐ ، ܐܝܟܢܐ ܕܡܚܐ ܣܠܝܠܘܬܐ ܡܦܘܣܚܬܢܝܬܐ . ܒܕܘܟܐ ܕܥܘܦܝܬܐ ܠܡܘܙܓܬܐ (ܨܘܪܬܐ ٣ ـ ٧) .

ܡܛܠ ܐܗܐ ܣܘܩܠܐ ܗܘܐ ، ܠܡܥܘܪܬܐ ܕܡܘܣܠܦܐ ܕܗܘܦܐ ܒܝܢ ܡܝܐ ܘܕܡܐ ، ܘܡܘܝܕܐ ܡܢ ܦܩܚܘܬܐ ܕܡܥܘܪܬܐ . ܗܘܝܬܐ ܕܕܪܝܬܐ ܕܡܝܐ ܥܠ ܓܦܐ ܢܦܫܘܬܢܝܐ ، ܘܕܝܢܬܐ ܕܕܡܐ ܒܡܐܢܐ ܕܡܝܐ ܠܗܘܢ ، ܥܠܝܗ ܒܗܕܐ ܙܘܓܐ ܗܦܟܐ .

ܦܬܐ ܡܕܝܢܬܐ ܐܗܐ ܡܬܢܝܬܐ ܒܡܢܫܘܬܐ ܗܦܟܬܐ (Counter Current) . ܘܗܘ ܡܦܕܐ ܠܕܡܐ ܗܕܝܟܐ ܒܡܐܢܐ ܡܘܗܘܢܐ ܕܡܝܐ . ܗܦܩܬܐ ܒܡܢܐ ܠܐ ܡܬܘܠܡܐ . ܐܠܐ ܡܠܝܠ ܡܢ ܐܦܚܝܒܝܢܗ ، ܘܦܬܐ ܕܕܝܢܬܐ ܒܡܢܫܘܬܐ ܝܠܗܐ ، ܠܗܘܕܝܬܐ ܕܓܦܐ ܢܦܫܘܬܢܝܐ .

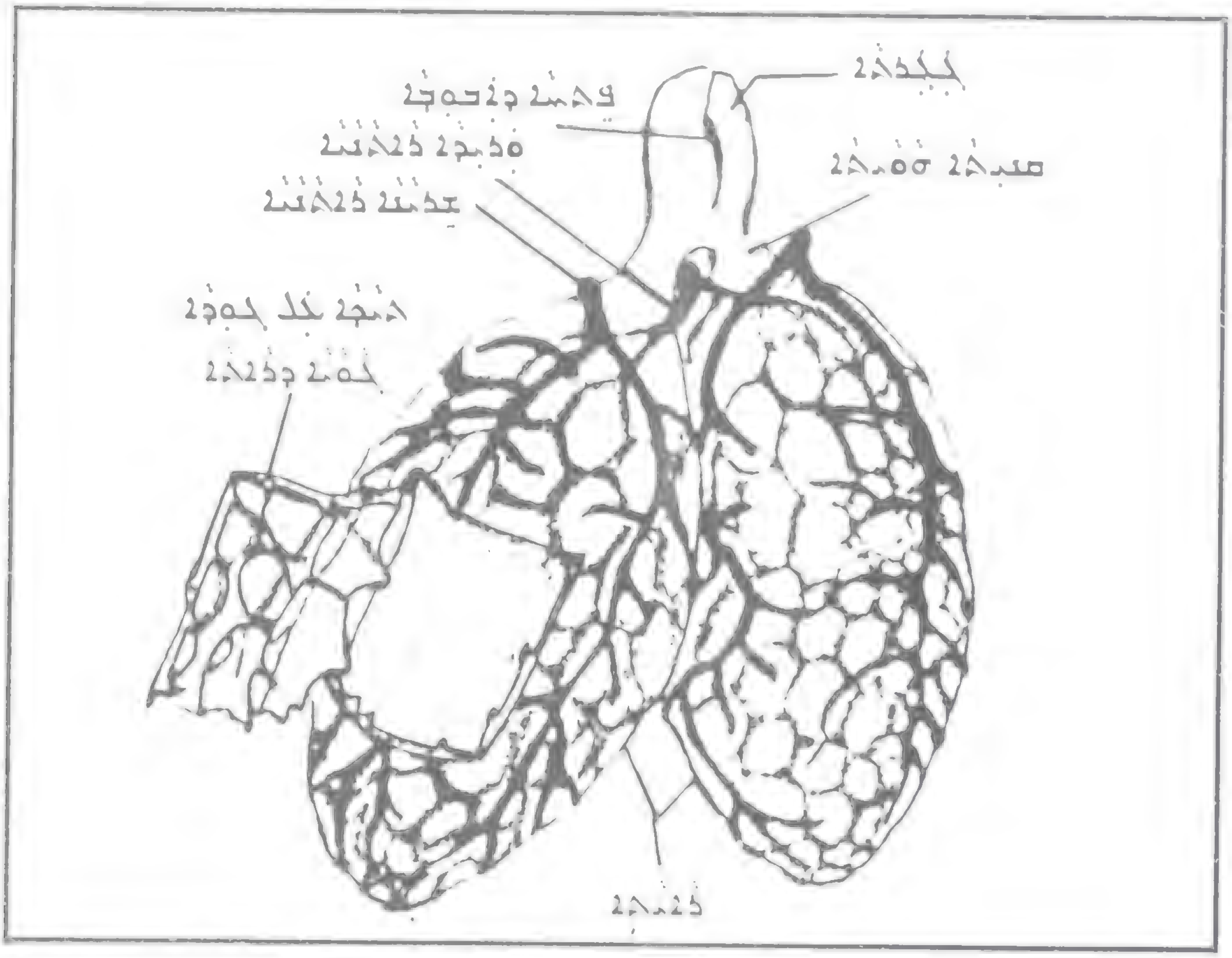


ܨܘܪܬܐ (٣ — ٧)

١١ ـ ٣ ـ ٣ ـ ܢܦܫܘܬܐ ܓܘ ܚܝܘܬܐ ܒܪܡܢܝܬܐ :

ܘܚܕ ܐܝܟܐ ܚܝܘܬܐ ܡܬܝܒܫܢܝܬܐ ܒܝܢ ܡܝܐ ܘܝܒܫܐ ، ܘܡܬܘܪܢܠܗܘܢ ܒܐܘܪܚܐ ܕܢܦܫܘܬܐ ܕܗܘܐ ܚܕܐ ܒܓܪܡܐ ܕܐܢܫܐ ܡܬܢܝܬܐ . ܘܐܝܟ ܒܠܝܗ ܡܢܝܢܐ ܗܕܐ ܒܚܕܐ ܡܬܠܝܐ ܠܚܕܪܐ ܓܘ ܒܠܘܥܬܐ ، ܟܕ ܗܘܐ ܠܓܪܡܐ

ܪ̈ܐܝܬܐ ܒܐܘܪ ܚܢܘܬܐ ܕܚܘܫܠܦ ܗܘܐ . ܦܬ̈ܐ ܚܕܬܐ ܠܗ ܪ̈ܐܝܬܐ
ܕܒܪ̈ܡܫܝܬܐ ܕܐܝܬ ܒܗ ܦܫܝܛܬܐ ܡܢ ܒܪ̈ܘܢܟܐ ܡܢ ܓܘܫܡܗ . ܠܗ ܚܘܬܐ
ܦܢ̈ܝܬܐ ܕܢ̈ܘܬܐ . ܘܐܗܐ ܟܕ ܠܢܦܫܘܬܐ ܕܐܢ̈ܝܬܐ ܠܘܚܗ . ܠܐ
ܡܠܝܐ ܠܡܦܪܢܬܐ ܕܡܫܘܚܬܗ ܡܢ ܐܦܩܝܢ . ܟܠ ܕܐܗܐ ܡܠܝܢ ܟܠ
ܝܘܡܐ ܢܦܫܘܬ̈ܐ ܐܚܪ̈ܢܐ . ܐܝܟ ܓܠܕܐ ܘܐܝܠܦܐ ܕܟܘܡܐ . ܡܬܪܓܡܐ
ܢܦܫܘܬܐ ܓܠܕܢܬܐ ܠܗ ܐܘܪܒܐ ܬܘܒܢܐ ܕܡܝܠܐ ٥٠٪ ܡܢ ܚܘܫܠܦܐ ܗܘܢܐ
. ܐܝܢܐ ܬܘܒܢܐ ܕܦܬܘܐ ܐܝܟܢ ܕܗܘܐ ܠܡܢܝܢܐ ܒܚܘܡܫܐ ܕܒܪ̈ܟܬܐ . ܗܘ
ܐܟܠ ܡܠܝܢܗ ܟܠ ܢܦܫܘܬܐ ܓܠܕܢܬܐ . ܘܠܗ ܒܪ̈ܡܫܝܬܐ ܕܘܒܟܝܬܐ ܐܝܟ
ܦܠܝܦܪܐ . ܗܘܝ ܕܐܢ̈ܝܬܐ ܡܫܚܐ ܟܒܝܬܐ ܡܘܪ̈ܟܝܢܗ . ܘܐܟܠܝܢ ܚܘܬܐ ܟܠ
ܚܘܫܠܦܐ ܗܘܦܢܐ ܡܢ ܠܗ ܓܠܕܐ . ܘܡܢܐ ܕܡܫܝܕ ܠܒܪ̈ܡܫܝܬܐ ܟܠ ܢܦܫܘܬܐ
ܓܠܕܢܬܐ . ܗܘܢܬܐ ܕܓܠܕܗ ܐܡܫܐ ܘܡܠܝܫܐ ܘܪܓܝܒܐ . ܘܡܙܘܪܐ ܒܫܒ
ܓܒܪܐ ܟܢܝܫܐ ܡܢ ܡܐܢ̈ܐ ܡܘܬܢ̈ܝܐ ܕܡܝܐ . ܘܫܟܒ ܕܡܝܗ ܟܠ ܙܘܒܢܬܐ
ܕܗܝܡܢ ܠܠܘܒܝܢ . ܗܝ ܕܡܙܘܝܢܐ ܡܢ ܦܩܘܕܗ . ܒܠܚܝܬܐ ܕܐܦܩܝܢ
ܠܚܘܪܐ ܕܠܘܚܡܐ ܐܚܝܢܬܐ ܡܢ ܝܘܡܐ ܟܢܫܐ .



ܨܘܪܬܐ (٨ - ٣) ܦܪܘܫܐ ܕܢܦܫܘܬܐ ܠܗ ܐܘܪܒܐ

ܘܡܠܟܘܬܐ ܐܣܘܪܝܬܐ ܕܒܒܒܠܘ ܡܬܝܢܝܬܐ ܠܒܪܡܫܝܬܐ. ܡܢ ܡܠܟܘܬܐ ܕܗܣܡܘܢܝܗ ܡܢ ܐܘܪܫܠܡ، ܒܐܘܪܚܐ ܕܠܒܢܐ ܘܐܪܡܐ ܦܢܝܩܝܬܐ. ܝܠܗ ܗܘܝܘ ܚܣܘܬܐ ܠܐ ܦܫܝܛܝܬܐ، ܘܡܫܬܡܥ ܒܗܘܢ ܚܘܠܦ ܚܝܠܐ ܒܗܘܦܐ، ܒܝܣܘܬܐ ܒܦܚܪܢܝܬܐ ܒܪܝܬܐ ܐܝܟ ܛܝܢܐ ܘܫܠܒܝܢܝܬܐ.

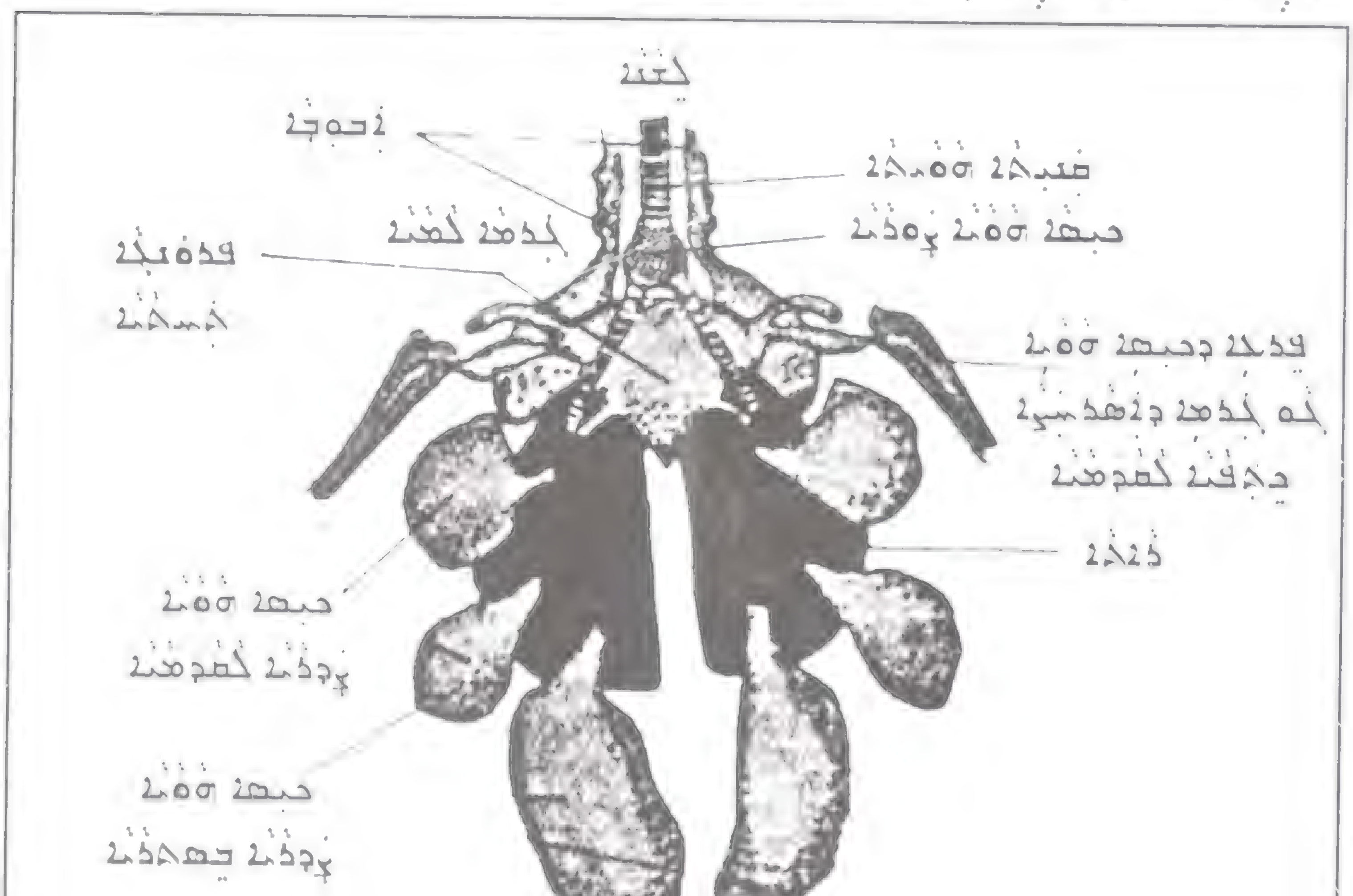
١١ . ٤ - ܢܩܝܫܘܬܐ ܥܠ ܚܨܦܐ ܦܚܪܢܝܬܐ ܒܪܝܬܐ :

ܒܟܘܡ ܡܢ ܗܘܢܐ ܐܝܟ ܕܢܩܫܝ ܢܩܝܫܘܬܐ ܡܦܘܫܪܢܝܬܐ. ܥܠ ܚܨܦܐ ܦܚܪܢܝܬܐ ܒܪܝܬܐ، ܘܚܕ ܡܢܗܘܢ ܡܢ ܒܪܡܫܝܬܐ ܢܩܫܝ ܢܩܝܫܘܬܐ ܐܪܡܝܬܐ، ܘܐܪܡܝܬܐ ܕܦܚܪܢܝܬܐ ܒܪܝܬܐ ܝܠܗ ܐܘܟܡܐ ܡܫܛܝܐ. ܦܫܝܛܐ ܝܠܗ ܒܡܘܡܝܐ ܕܡܘܠ ܐܦܝܠܐ. ܡܬܘܪܐ ܡܢ ܚܕ ܛܝܢܐ ܕܟܝܢܐ ܡܢ ܐܬܘܪܐ، ܥܠܡܝ ܒܪܘܫܝܬܐ ܦܠܛܝ ܡܢܝܗ ܚܕ ܡܢܝܢܐ ܠܒܘܪܐ ܡܢ ܗܪܡܘܠܘܢܝܬܐ (ܦܝܫ ܡܒܘܡܫܐ ܡܢܝܢܗ ܒܐܪܝܗ ܐܝܠܝܢ ܕܒܪܢܫܐ ܒܐܝܟ ٦٠٠ ܡܠܘܐܐ ܗ ܗܪܡܘܠܘܢܝܬܐ). ܡܘܟܝܢܐ ܝܠܗ ܗܪܡܘܠܘܢܝܬܐ ܣܝܘܡܬܐ ܒܪܝܬܢܝܬܐ ܕܐܬܐ. ܘܢܦܝܩܐ ܡܢ ܐܘܟܡܐ ܐܪܡܝܐ. ܝܠܗ ܦܫܝܛܐ، ܟܬܝܒܐ ܡܢ ܣܡܟܐ ܥܠ ܡܫܛܝܐ ܕܡܐ ܠܣܠܝܠܘܬܐ ܕܗܪܡܘܠܘܢܝܬܐ، ܐܘ ܡܢܝܬܐ ܕܡܬܐ ܠܝܘܪܢܝܗ، ܕܒܪܐ ܒܘܫܠܦܐ ܗܘܦܐ ܒܢܝܗ.

١١ . ٥ - ܢܩܝܫܘܬܐ ܥܠ ܛܝܢܐ :

ܦܫܝܛܐ ܝܠܗ ܛܝܢܐ ܡܢ ܒܪܢܫܐ ܘܐܪܡܝܬܐ ܐܣܘܪܝܬܐ، ܒܠܐ ܣܦܝܩܝܗ ܥܠ ܗܪܡܘܠܘܢܝܬܐ ܗܘܝܬܐ، ܘܡܫܠܡܝܗ ܒܡܘܬܘܢܝܬܐ ܗܘܝܬܐ. ܘܐܝܟ ܝܠܗ ܐܬܘܪܐ ܕܡܛܐ ܡܛܪܝܗ ܒܡܣܘܡܐ ܕ ١٠ ܡܢܒܪܘܡܝܬܐ، ܗܘܝܢ ܡܢ ܛܝܢܐ ܡܝܘܬܐ ܦܪܝܫܐ ܥܠ ܐܪܥܐ ܕܐܬܐ. ܘܥܠܝܗ ܕܐܬܐ ܕܛܝܢܐ ܒܐܝܟܘܬܐ ٩ ܒܝܬܐ ܗܘܝܐ ܡܛܪܐ ܒܢܘ. ܚܕ ܗܘܡܐ ܡܢܝܗ ܥܒܕܝ ܒܪܡܫܐ ܒܟܬܒܐ، ܘܐܣܝܪܐ ܥܒܕܝ ܒܘܪܡܐ، ܥܠ ܐܪܥܐ ܦܝܫܬܐ ܕܝܪܒܐ ܘܒܪܡܐ، ܘܒܘܪܒܐ ܡܛܪܝ ܡܢ ܥܒܝܛܘܬܐ ܕܠܘܡܐ ܕܛܝܢܐ (ܐܣܩܡܐ ٣ - ٩)، ܘܡܘܫܦܚܐ ܠܗܘ، ܠܝܗ ܝܠܟܐ ܒܗܘܡܐ ܝܩܪܬܐ ܡܢ ܣܠܝܠܘܬܐ ܝܘܪܬܐ. ܘܪܘܝܫܘܬܐ ܠܣܘܪܝܬܐ ܕܟܬܒܐ ܥܠ ܗܪܡܘܪܘܬܐ ܕܗܘܡܐ. ܟܬܒܐ ܠܘܚܐ ܕܐܠܦܐ ܘܡܘܪܐ (ܗܪܡܝܬܐ) ܘܟܬܒܐ ܦܫܝܛܐ. ܡܛܠ ܒܘܡܟܪܝܬܐ ܕܛܘܡܐ ܠܒܘܪܝܬܐ ܒܘܪܐ، ܘܐܝܬܐ ܠܝܬ ܠܗܘ، ܐܦܐ ܕܦܝܫ ܡܘܕܥܐ. ܥܠ ܗܪܡܘܪܘܬܐ ܕܢܩܝܫܘܬܐ، ܐܦ ܠܐ ܐܟܝܕ ܠܘܡܐ ܕܒܝܬܐ ܗܘܝܐ، ܒܐܘܐ

ܡܫܘܚܘܬܐ، ܘܚܒܘܫ ܡܢ ܟܝܣܐ ܕܐܐܪ ܘܓܪܡܐ، ܦܬܝܚ ܡܬܦܠܚܐ ܟܝܣܐ ܗܘܝܐ ܐܝܟ ܐܘܪܚܐ ܠܗܘܐ ܟܠܗܘܢ. ܘܠܝܬܠܗܘܢ ܡܕܐ ܠܗ ܡܫܘܚܘܬܐ ܕܬܘܣܠܦܐ ܗܘܦܐ. ܠܗ ܝܬܘܬܐ ܟܠ ܟܪܣܬܐ ܕܩܣܘܪܐ ܡܪܥܝܐ ܢܫܡܬܢܐ ܡܛܝܒܐ ܠܦܪܫܘܠܝܬܐ ܗܘܝܬܐ. ܟܝܪ ܗܘܐ ܕܫܘܡܐ. ܡܢ ܠܗ ܠܒܪܐ ܕܐܟܘܬܐ ܡܝܢܝܐ ܠܓܘ ܟܝܣܐ ܗܘܝܐ. ܘܟܘܢܫܐ ܡܢ ܐܟܘܬܐ ܟܝܣܐ ܥܘܝܐ ܠܗ ܦܪܫܝ ܪܐܝܬܐ. ܦܬܪܟܝ ܡܝܢܝܐ ܡܝܬܘܢܝܬܐ ܗܘܝܬܐ. ܐܝܟܐ ܕܟܪܐ ܬܘܣܠܦܐ ܗܘܦܐ. ܘܠܗ ܡܫܬܪܝܘܬܐ ܕܢܫܡܬܐ. ܟܝܪ ܗܘܐ (ܡܢ ܦܠܓܐ ܕܘܪܟܬܐ ܟܠ ܟܝܣܐ ܡܢ ܟܘܡܪܬܐ ܕܠܘܫܡܐ). ܡܢ ܟܝܣܐ ܠܐܟܘܬܐ ܡܝܢܝܐ ܥܘܝܐ. ܘܟܗܪ ܗܕܝ ܠܡܝܬܘܢܝܬܐ ܗܘܝܬܐ ܟܣܪܐ ܐܘܪܚܐ ܐܣܪܝܬܐ. ܘܟܘܕܟܐ ܡܣܝܟ ܗܘܐ ܕܡܝܬܘܢܝܬܐ ܗܘܝܬܐ ܦܪܫܝ ܪܐܝܬܐ. ܘܐܗܐ ܡܠܗ ܣܪܐ ܐܢܫܝܘܬܐ ܡܢ ܦܢܝܬܐ ܠܛܘܝܪܐ. ܕܟܪܟܐ ܡܫܠܪܝܘܬܐ ܕܣܪܐ ܟܘܒܫܘܬܐ ܝܠܝܬܐ. ܡܢ ܠܗ ܡܫܘܚܘܬܐ ܕܬܘܣܠܦܐ ܗܘܦܐ. ܟܢܝܫܬܐ ܘܡܢܝܫܬܐ. ܘܐܦ ܐܢܫܝܘܬܐ ܕܫܡܘܬܐ ܠܛܝܪܐ ܟܡܘܪܐ. ܟܕ ܗܘܝ ܗܘܐ ܕܟܝܣܐ ܣܒ ܐܘܪܚܐ ܦܘܫܩܐ.



ܨܘܪܬܐ (٣ - ٩) ܗܕܡܐ ܕܢܫܡܬܐ ܠܛܝܪܐ

١١-٦ - ܢܫܝܡܘܬܐ ܓܘ ܚܝ̈ܘܬܐ :

ܒܥܡܠܝܢ ܢܫܝܡܘܬܐ ܓܘ ܒܪܢܫܐ ܐܝܟ ܓܘܫܩܐ ܒܗܘ ܚܝܘܬܐ. ܢܩܠܒ ܕܕܡܝ ܕܐܢܫܐ ܓܘ ܣܠܝܠܘܬܐ ܙܥܘܪܬܐ، ܡܫܝܚܬܐ ܒܚܝܠܐ ܓܢܒܢܝܐ، ܘܡܕܒܠܘܢ ܣܥܪܐ ܣܠܝܠܘܬܐ، ܦܝܫܐ ܠܗ ܡܫܘܡܗܐ ܣܠܝܠܘܬܐ ܓܢܒܢܝܬܐ (Pleural Cavity). ܕܡܫܝܚܬܐ ܠܗ ܠܣܪܐ ܒܕܡܘܬܐ ܡܢ ܚܝܠܐ ܚܕܐ ܙܘܓܐ، ܕܒܝܠܗ ܡܘܕܐ ܕܩܕܝܐ ܓܢܒܢܝܐ. ܘܡܫܘܕܪܐ ܠܗ ܠܗܪܝܐ ܕܣܠܝܠܘܬܐ ܙܥܘܪܬܐ، ܡܢ ܐܠܦܐ ܘܡܫܘܡܕܢܬܐ ܒܝܢ ܐܠܦܢܘܬܐ، ܘܡܫܦܩܝܢ ܣܒܝܐ ܡܫܘܕܪܐ ܡܢ ܘܗܘܐ ܠܡܫܡܕܢܢܐ ܐܪܐ ܕܣܠܝܠܘܬܐ.

ܠܥܠ ܗܕܐ ܠܕܡܝ ܕܐܢܫܐ ܒܗܘܕܢܐ ܕܝܚܝܕܐ ܢܫܝܡܘܬܢܐ، ܡܫܘܕܪܐ ܡܢ ܣܠܝܠܘܬܐ ܢܫܒܬܢܝܐ ܘܟܠܘܒܬܐ ܘܓܒܕܬܐ ܘܐܒܘܒܐ ܕܗܘܐ ܘܡܕܘܡܝܢ ܦܕܓܗ، ܕܕܡܝ ܡܢܗ ܗܘܢܐ ܘܡܘܟܝܢ ܠܓܘ ܕܡܐ، ܐܘܟܝܡ ܡܢܘܗܝܐ (ܐܚܟܡܬܐ ٣-١٠، ܐ، ܒ، ܓ).

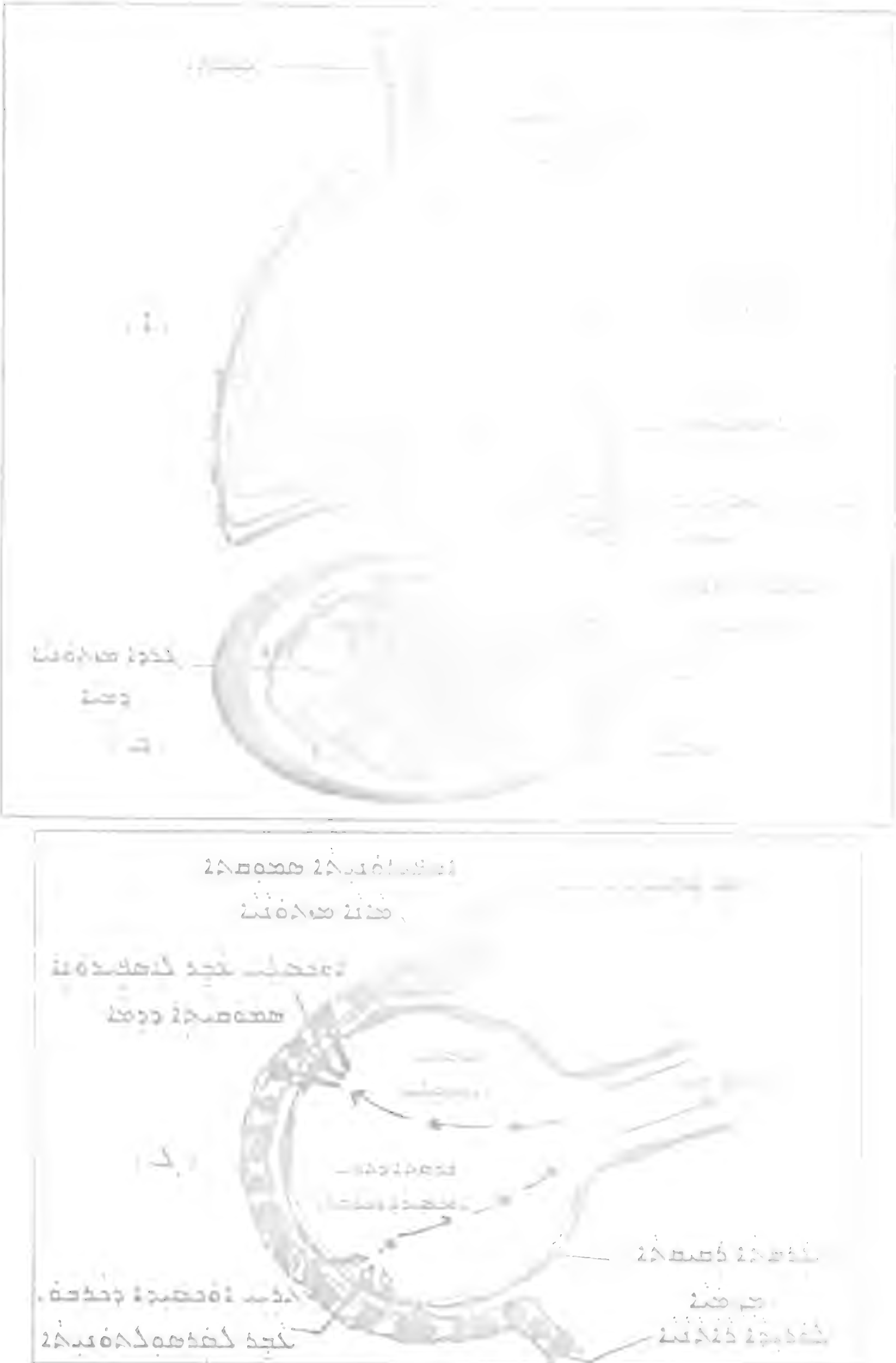
ܡܢܗܕܪܐ ܡܟܘܪܘܬܐ ܕܢܫܝܡܘܬܐ ܓܘ ܒܪܢܫܐ، ܘܡܕܥܐ ܕܡܕܪܬܢܘܬܐ ܥܠ ܗܠܗ ܨܒܘܬܐ ܥܠܡ ܡܫܘܕܪܘܬܐ ܕܟܡܝܘܬܐ ܒܐܘܟܣܓܝܢ، ܘܡܕܘܡܝܗ ܡܢ ܗܘܝܐ ܕܡܪܢܝܘܗ ܐܘܟܣܓܝܢ ܕܡܪܟܒ، ܢܦܩܐ ܡܢ ܗܝܡܢܘܬܗ، ܘܡܗܝܡܢܘܬܐ ܕܟܡܝܘܬܐ ܗܝܕܪܘܓܝܢܝܐ (PH) ܠܕܡܐ. ܦܝܫ ܡܘܦܩܢܐ ܐܘܟܣܓܝܢ ܓܘ ܢܫܝܡܘܬܐ ܡܕܪܬܢܝܬܐ، ܐܘܟܝܡ ܓܘ ܓܒܫܬܐ ܕܡܘܪܕܐ. ܘܓܒܪܐ ܕܐܘܟܣܓܝܢ ܓܘ ܢܫܝܡܘܬܐ، ܒܝܠܗ ܓܒܫܬܐ ܕܗܝܕܪܘܓܝܢ ܕܐܝܬ ܓܘ ܡܘܪܕܐ، ܘܡܣܠܩܝܗ ܠܕܡܐ، ܦܝܫܐ ܠܗ ܡܫܘܡܗܐ ܡܢܐ ܡܘܣܠܟ ܚܝܝܐ، ܘܦܝܫ ܡܘܪܝܫܐ ܡܢ ܟܡܝܘܬܐ ܒܪܝܬܐ ܕܢܦܩܐ ܡܢ ܗܝܡܢܘܬܐ، ܒܗܘܕܢܐ ܕܡܦܠܚܬܐ، ܐܘ ܥܡ ܗܕܐ ܕܝܬܝܪܐ. ܘܡܩܝܡܬܐ ܒܟܡܝܘܬܐ ܕܐܘܟܣܓܝܢ ܡܘܦܩܢܐ ܥܡ ܦܪܝܬܐ ܕܡܘܪܟܒܐ ܕܡܠܘܐܐ ܡܘܪܕܐ، ܗܝ ܓܘܫܩܐ ܦܝܫ ܡܫܘܚܠܦܐ ܡܫܚܠܦܐ ܒܝܕ ܗܕܝ ܡܘܪܟܒܐ ܡܢ ܟܪܝܘܬܐ. ܥܠ ܕܐܗܐ ܗܢܝܢ ܡܫܚܠܦܐ ܠܣܪܐ ܟܡܝܘܬܐ ܡܢ ܐܘܟܣܓܝܢ ܠܡܫܟܚܘܬܐ ܒܝܕ ܕܡܐ، ܡܢ ܗܝ ܕܗܢܝܢ ܐܝܠܗ ܟܪܝܘܬܐ. ܥܠ ܕܐܗܐ ܠܟܘܪܐ ܕܢܫܝܡܘܬܐ ܒܝܠܗ ܦܫܝܡܘܬܐ ܒܝܢ ܟܡܝܘܬܐ CO_2 ܦܠܛܬܐ، ܘܟܡܝܘܬܐ ܕܐܘܟܣܓܝܢ ܡܘܦܩܢܐ، ܠܦܘܬ ܡܫܘܚܬܐ ܕܓܢܐ ܐܘܟܝܡ :

ܟܡܝܘܬܐ ܕ CO_2 ܦܠܛܬܐ

ܟܘܪܐ ܕܢܫܝܡܘܬܐ = ______________

ܟܡܝܘܬܐ ܕ O_2 ܡܘܦܩܢܐ

ܘܐܗܐ ܦܫܝܡܘܬܐ ܡܫܚܠܦܬܐ ܠܗ ܠܡܫܘܕܥܘܬܐ ܥܠ ܒܢܝܘܬܐ ܕܡܘܪܕܐ ܡܐܘܟܠܐ. ܘܐܝܟ ܕܗܘܐ ܡܠܘܐܐ ܟܪܒܘܗܝܕܪܐ ܐܘ ܩܛܝܢܐ، ܗܘܝܐ ܦܫܝܡܘܬܐ (١). ܘܐܝܟ ܕܗܘܐ ܡܘܪܕܐ ܡܠܘܐܐ ܡܫܚܢܐ، ܗܘܝܐ ܦܫܝܡܘܬܐ (٠,٧). ܘܡܠܘܐܐ ܦܪܘܬܝܢܐ ܗܘܝܐ ܦܫܝܡܘܬܗ (٠,٨)، ܘܐܝ- ܙܕܐ ܡܢ (١)، ܢܫܝܡܘܬܐ ܗܘܝܐ ܠܐ ܗܘܝܐ.



ܨܘܪܬܐ (٣ - ١٠) ܐ - ܐܣܘܪܐ ܕܡܫܘܠܡܢܘܬܐ ܕܒܕܝܩܬܐ

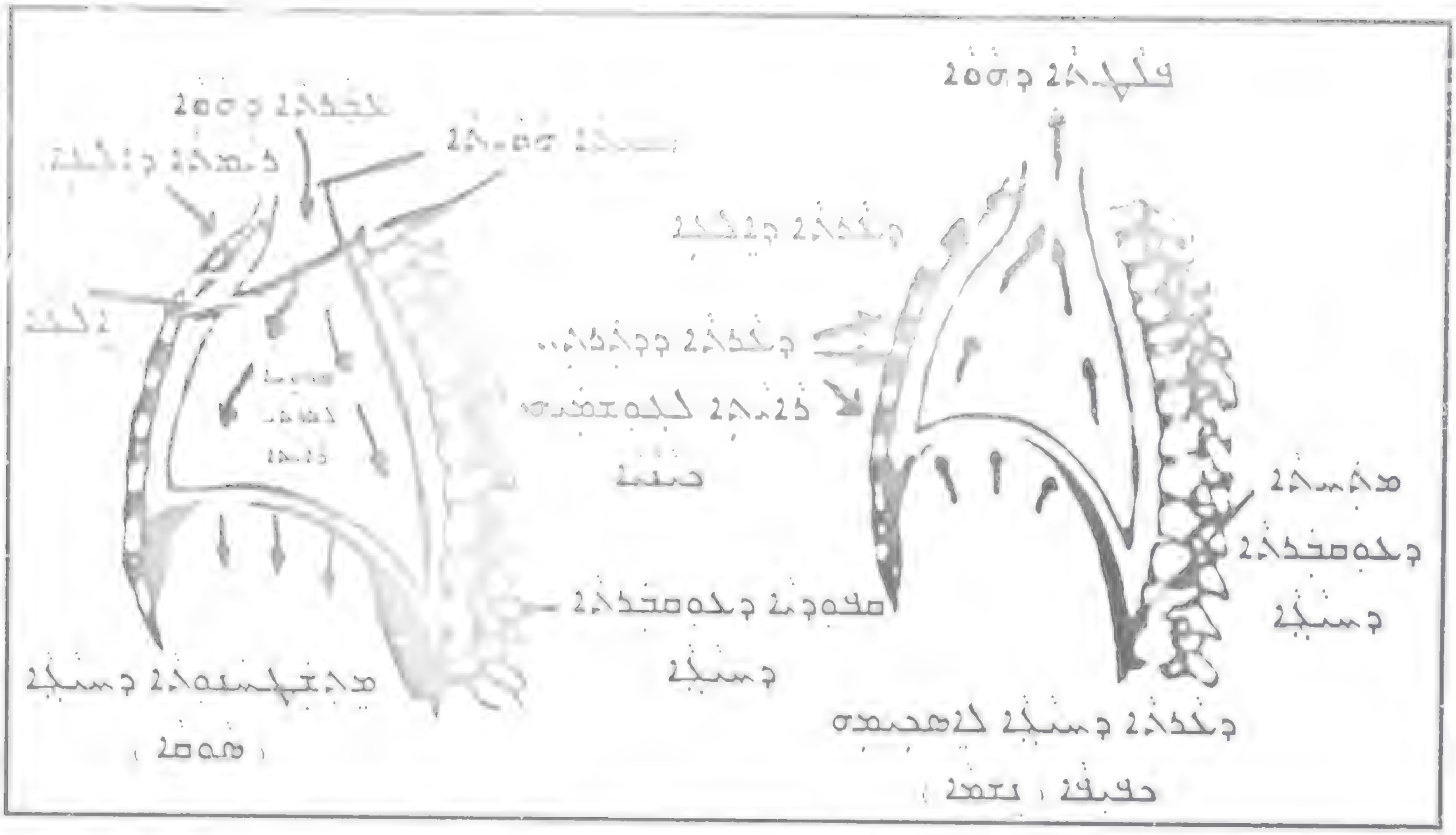
ܒ - ܡܘܫܚܐ ܕܡܫܘܠܡܢܘܬܐ ܘܡܫܘܠܡܢܘܬܐ ܕܐܠܘܢܐ ܕܥܡܐ ܡܢܝܢܐ

ܐܢܫܝ . ܓ - ܡܘܣܦܐ ܗܘܐ ܠܗ ܡܫܘܠܡܢܘܬܐ ܕܐܠܘܢܐ .

ܘܰܡܕܺܝܢ̈ܬܳܐ ܕܒܶܝܬ ܢܰܗܪܺܝܢ ܘܡܰܕܢܚܳܐ ܡܶܢ ܟܠ ܦܢܺܝܬ݂ܳܐ ܀

ܘܰܒܬ݂ܰܪ ܗܳܕܶܐ ܒܫܢܰܬ݂ ܐܳܪ̈ܓܢܶܐ ܘܩܰܕ̈ܡܳܝܶܐ ܗ݇ܘܳܐ ܚܕ ܡܰܠܟܳܐ ܘܫܘܠܛܳܢܳܐ ܘܦܘܠܚܳܢܳܐ ܕܰܐܪ̈ܥܳܬ݂ܳܐ ܕܡܰܕܢܚܳܐ ܘܡܰܥܪܒܳܐ ܘܒܰܬ݂ܪܶܗ ܐܶܬ݂ܳܐ ܠܰܐܬ݂ܪܳܐ ܕܦܳܪܣ ܚܠܳܡ ܐܰܡܺܝܪܳܐ ܕܡܰܠܟܘܬ݂ܳܐ ܫܘܠܛܳܢܳܐ ܕܰܐܪ̈ܥܳܬ݂ܳܐ ܡܶܢ ܩܕ݂ܳܡ ܠܰܡܠܰܟ݂ܬ݂ܳܐ ܘܡܰܠܟܘܬ݂ܳܐ ܕܐܰܢܓܠܺܝܙ̈ܳܝܶܐ . ܠܗ ܡܕܝܢܬܐ ܥܰܡܪ̈ܳܐ ܡܶܢ ܩܰܕܡܳܐ . ܡܟܘܒܪܐ ܗ̇ܘܳܐ ܐܰܝܟ ܡܰܠܟܘܬ݂ܳܐ ܡܶܢ ܥܳܠܡܳܐ ܒܰܟ݂ܬ݂ܳܒ݂ܶܐ ܡܶܢ ܡܶܢܝܳܢܳܐ ܐܰܢܓܠܺܝܙ̈ܳܝܶܐ . ܦܰܠܓܳܐ ܡܶܢܗܘܢ ܐܰܝܟ ܠܟܘܡܦܢܝܬܐ ܐܰܢܓܠܺܝܙܳܝܬܳܐ . ܡܟܘܒܪܐ ܗ̇ܘܳܐ ܡܶܢ ܟܘܡܦܢܝܬܐ ܕܡܠܟܘܬܐ ، ܘܟܘܡܦܢܝܬܐ ܕܫܘܩܐ

ܗܳܕܶܐ ܗܘܳܬ݂ ܡܶܢ ܦܠܓܘܬ݂ܳܐ ܕܡܓܘܕܐ ܕܟܘܡܦܢܝܬܐ ܐܰܢܓܠܺܝܙܳܝܬܳܐ . ܘܐܝܬ ܗܘܳܐ ܫܠܝܛ ܥܠ ܟܠ ܡܕܝܢܬܐ . ܘܥܒܕ ܣܢܩܐ ܐܦܣܘܬܐ ܕܚܪܫܘܬܐ ، ܣܠܩ ܡܢ ܐܢܫܘܬܐ ܘܦܘܬܐ ܥܠ ܝܕ ܫܠܝܛܘܬܐ ܝܘܪܩܬܐ . ܡܚܕܐ ܐܝܟ ܘܫܩܠ ܒܡܣܘܬܐ ܒܫܠܝܛܘܬܐ ܕܝܘܪܩܐ ، ܘܡܚܕܐ ܕܦܘܪܣܐ ܠܟܘ ܡܕܝܢܬܐ ܐܢܓܠܝܙܝܬܐ . ܘܐܝܟ ܗܘܐ ܠܘܬܗ (ܐܫܥܝܐ ٣ - ١١) . ܘܠܗ ܡܠܟܘܬܐ ܕܝܘܡܢܐ ܕܥܠܡܐ ܫܠܝܛܘܬܐ ܝܘܪܩܬܐ ܠܟܘܡܦܢܝܬܐ ܡܕܝܢܬܐ . ܒܬܠܬܐ ܕܦܘܪܣܐ ܕܟܘܡܦܢܝܬܐ ܐܢܓܠܝܙܝܬܐ ܐܝܟ ܕܥܠ ܡܕܝܢܬܐ ܐܢܓܠܝܙܝܬܐ . ܘܦܠܓܐ ܚܕܐ ܒܡܣܘܬܐ ܡܢ ܗܘܐ ܐܦܣܘܬܐ ܠܗܕܐ ܕܡܕܝܢܬܐ ܠܡܕܝܢܬܐ ܐܢܓܠܝܙܝܬܐ . ܒܡܠܟܘܬܐ ܕܦܘܪܣܐ . ܘܠܗ ܠܗܝ . ܡܦܘܩܐ ܕܠܘܡܕܐ ܕܡܕܝܢܬܐ ܐܢܓܠܝܙܝܬܐ . ܡܛܠ ܕܐܝܬܐ ܕܫܠܝܛܐ ܡܢ ܘܡܘܬܐ ܕܝܢܐ . ܦܝܫܐ ܡܦܘܩܐ ܒܡܣܘܬܐ ܕܗܘܐ . ܗܝ ܕܡܢܕܥܐ ܠܗ ܡܠܟܘܬܐ ܕܦܘܪܣܐ . ܦܠܓܐ ܡܢ ܝܘܡܐ ܠܗ ܡܠܟܘܬܐ ܕܝܘܡܢܐ . ܒܡܢܝܢܘܬܐ ܕܐܢܫܘܬܐ ܐܝܟ ٤٠٠ ܡܠܝܘܢܐ ، ܘܦܝܫܐ ܡܬܚܘܡܐ ܕܝܘܡܢܐ ܡܠܟܘܬܐ ܠܦܪܘܛܝܣܛܢܛܝܬܐ ܐܢܓܠܝܙܝܬܐ ، ܘܡܬܚܘܒ ܒܡܘܕܥܢܘܬܐ ܕܦܠܓܐ ܒܐܘܪܘܦܐ ، ܘܗܘ ܐܝܟ ܐܝܟ ٢٥٠ ܡܠܝܘܢܐ . ܘܡܕܢܚܐ (١٥٠ ܡܠܝܘܢܐ) . ܡܠܟܐ ܠܐܘܪܚܐ ܐܢܓܠܝܙܝܬܐ ، ܐܝܟ ܕܠܐ ܩܪܒ ܠܘܬܗ ܒܡܫܠܡܐ ܗܘܐ ܒܬ ܕܡܢ ܠܗ ܡܕܝܢܬܐ ܐܢܓܠܝܙܝܬܐ . ܘܦܝܫܐ ܠܗ ܡܬܚܘܡܐ ܒܦܘܬܐ ܡܝܬܐ . ܘܥܠ ܕܗܘܐ ܐܝܬ ܗܘܐ ܡܢܝܢܐ ܠܗ ܦܘܪܣܐ ܕܡܕܝܢܬܐ ܐܝܬܐ ܡܢ ܒܡܠܟ ܗܘܐ .



ܐܣܟܡܐ (٣ - ١١) ܡܚܘܝܢܐ ܠܬܪܬܝ ܡܫܘܚܬܐ ܕܫܩܠܐ ܘܝܗܒܐ

ܐ - ܫܘܚܠܦ ܗܘܐ ܕܪܐܬܐ (Plumonary Ventilation) :

ܗܘ ܝܠܗ ܠܡܢܝܢܐ ܕܗܘܐ ܡܫܘܚܠܦܐ ܒܝܢ ܐܪܥܐ ܕܪܐܬܐ ܘܗܘܐ ܕܐܬܪܐ ܠܗ ܚܕ ܕܩܝܩܐ . ܘܐܝܟ ܡܡܘܨܥܐ ܒܚܫܒܘܢܬܐ ܕܥܒܝܕܬܐ ، ܐܢܫܢ ܕܗܘܐ ܡܢܝܢܐ ܕܢܫܝܡܘܬܐ ٢٠ ܓܘܪܐ ܠܗ ܚܕ ܕܩܝܩܐ ، ܘܠܡܢܝܢܐ ܡܠܐܐ ٤٠٠ ܡܠܝܡܝܬܪܐ ܒܟܠܢܐ ܠܝܬܪܐ ܡܢ ܗܘܐ .

ܫܘܚܠܦ ܗܘܐ ܕܪܐܬܐ - ܠܡܢܝܢܐ ܡܠܐܐ ܡܢܝܢܐ ܕܢܫܝܡܘܬܐ

= ٤٠٠ ٢٠ = ٨٠٠٠ ܡܠܝܡܝܬܪܐ ܡܢ ܗܘܐ ܠܗ ܚܕ ܕܩܝܩܐ = ٨ ܠܝܬܪܐ ܡܢ ܗܘܐ ܠܗ ܕܩܝܩܐ .

ܒ - ܫܘܚܠܦ ܗܘܐ ܐܠܒܝܘܠܐܝܬܐ (Alveolar Ventilation) :

ܗܘ ܝܠܗ ܠܡܢܝܢܐ ܕܗܘܐ ܡܫܘܚܠܦܐ ܒܝܢ ܗܕܐ ܕܪܐܬܐ ܘܗܘܐ ܕܐܬܪܐ ، ܗܘ ܕܡܛܘܠܝܗ ܠܡܫܡܫܢܘܬܐ ܠܗ ܡܫܘܚܬܐ ܕܫܘܚܠܦ ܗܘܝܐ ، ܘܐܝܟ ܡܡܘܨܥܐ ܒܚܫܒܘܢܗ ܒܚܫܒܘܢܬܐ ܕܥܒܝܕܬܐ ، ܐܢܫܢ ܕܗܘܐ ܡܢܝܢܐ ܕܢܫܝܡܘܬܐ ٢٠ ܓܘܪܐ ܒܚܕ ܕܩܝܩܐ ، ܘܠܡܢܝܢܐ ܡܠܐܐ ٤٠٠ ܡܠܝܡܝܬܪܐ ܒܟܠܢܐ ܠܝܬܪܐ ܡܢ ܗܘܐ .

ܫܘܚܠܦ ܗܘܐ ܐܠܒܝܘܠܐܝܬܐ - (ܠܡܢܝܢܐ ܡܠܐܐ ܕܘܟܐ ܡܝܬܐ) ܡܢܝܢܐ ܕܢܫܝܡܘܬܐ .

= (٤٠٠ ١٥٠) ٢٠

= ٢٥٠ ٢٠ = ٥٠٠٠ ܡܠܝܡܝܬܪܐ ܡܢ ܗܘܐ ܠܗ ܕܩܝܩܐ

= ٥ ܠܝܬܪܐ ܡܢ ܗܘܐ ܒܚܕ ܕܩܝܩܐ

(ܒ) ܦܘܫܟܐ ܕܐܪ̈ܘܚܐ :

ܐ) ܦܘܫܠܩܐ ܦܘܪܫܐ ܠܗ ܐܠܐ ܡܢ ܠܗ ܚܘܠܡܢܐ ܕܡܫܚܬܐ ܕܪ̈ܘܚܐ (ܐܟܣܓܝܢ) :

ܐܝܟܢ ܕܝܠܗ ܚܘܦܪܐ ܡܢ ܠܗ ܬܪܝܢܐ ܕܟܝܡܝܐܝܐ ܕܐܘܟܣܓܝܢ ܕܢܘܪܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ ܠܗ ܐܠܐ . ܐܝܟ ܕܝܠܗ ܝܕܝܥܐ ܠܗ ܦܘܪܫܐ ܕܐܢܫܐ ܐܝܬܘܗܝ ܕܪ̈ܘܚܐ . ܒܠ ܪܕܝܐ ܡܢܦܘܫܝܐ ܠܟܠ ܚܕ ܡܫܚܐ . ܐܝܟ ܐܘܟܣܓܝܢ . ܘܟܪܒܘܢ ܐܘܟܣܝܕܐ ܕܬܪܝܢ ܘܢܝܬܪܘܓܝܢ . ܕܝܠܗ ܗܘ ܚܕ ܗܘܐ ܕܟܝܡܝܐܝܐ ܠܢܘܪܐ .

ܐܝܟܢ ܪܕܝܐ ܡܢܦܘܫܝܐ ܠܟܠ ܚܕ ܡܫܚܐ ܠܗ ܗܘܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ . ܘܡܬܚܫܒܐ ܠܗ ܡܢ ܗܕܐ ܐܘܪܚܐ ܕܡܫܘܚܬܐ ܡܢ ܟܠ ܡܫܚܐ ܕܐܝܬܘ . ܘܐܝܟܢܐ ܡܢܛܘܦܐ ܠܦܘܪܫܐ ܕܐܢܫܐ ܐܝܬܘ :

ܪܕܝܐ ܡܢܦܘܫܝܐ ܠܟܠ = ܪܕܝܐ ܟܠܢܝܐ

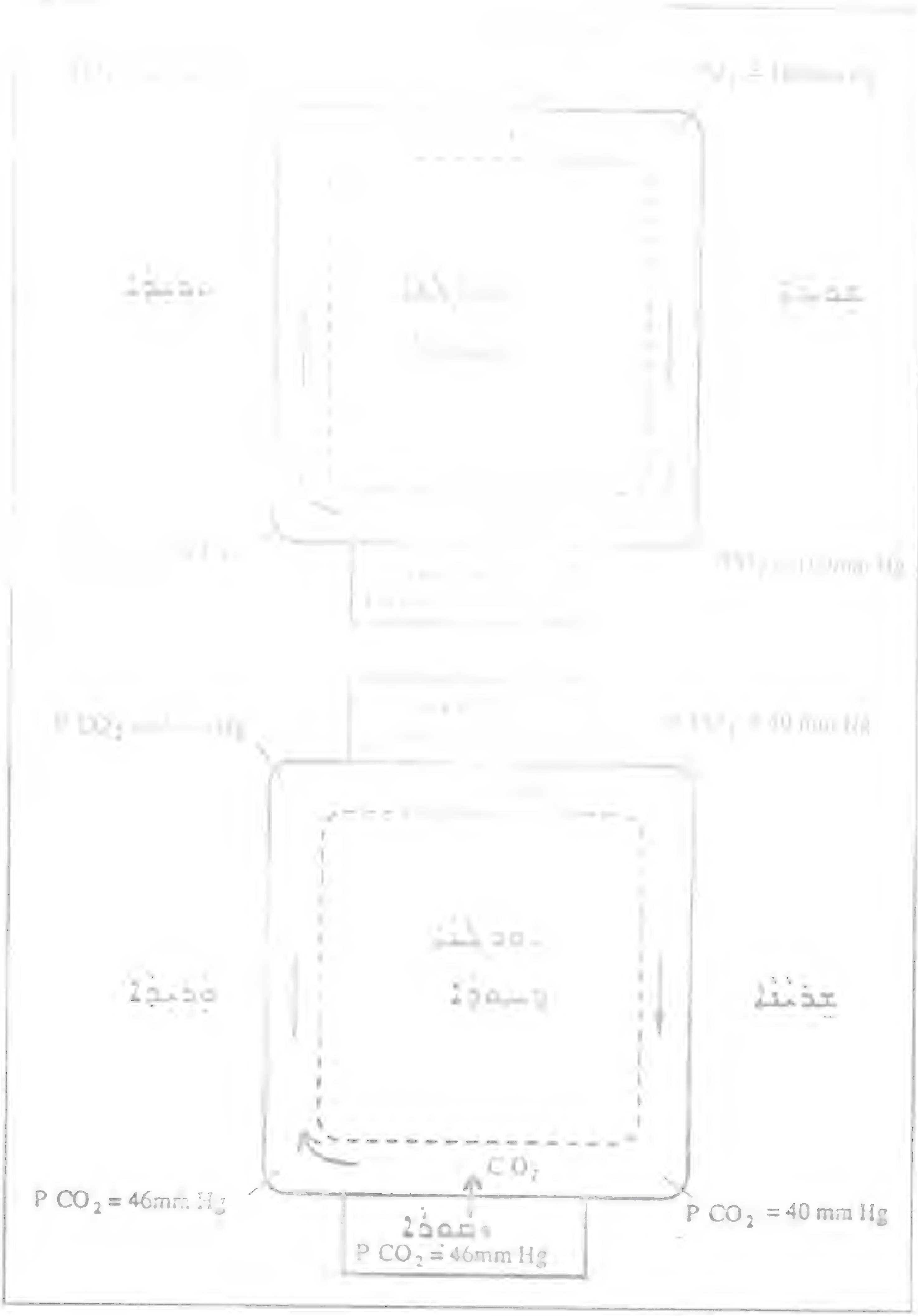
ܒܝܬ ܡܝܠܝܡܛܪܐ ܕܙܝܒܩ ܡܫܘܚܬܐ ܒܝܬܐ ܠܟܠ ܐ P (Pre ssure) (٧٦٠)

ܘܡܢ ܡܫܘܚܬܐ ܒܝܬܐ ܠܐܘܟܣܓܝܢ ܠܗ ܗܘܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ ܝܠܗ ١٤٪

ܘܒܠ ܕܐܝܢܐ ܗܘܐ ܪܕܝܐ ܡܢܦܘܫܝܐ ܠܐܘܟܣܓܝܢ ܠܗ ܗܘܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ :

$$PO_2 = \frac{760 \times 14}{100} = 106.4 \text{ ܡܝܠܝܡܛܪܐ ܕܙܝܒܩ}$$

ܐܦܢ ١٠٠ ܡܝܠܝܡܛܪܐ ܕܙܝܒܩ ܠܦܘܪܫܐ ܒܝܢܬܐ ܕܡܫܚܬܐ ܕܪܘܚܐ ܘܕܝܡܐ ܠܓܘ ܕܡܐ . ܘܦܪܫܗ ܠܗ ܡܢܝܐ ܡܘܗܘܢܐ ܒܓܘܪܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ ܗܘܝܐ . ܗܘܐ ܦܪܘܫܐ ܒܝܢ ܗܘܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ ܘܕܡܐ ܠܗ ܡܘܗܘܢܝܬܐ ܕܡܢܝܬܐ ܡܢ ܚܕ ܕܡܐ ܕܐܝܬܘܗܝ ܡܢ ܗܕܐ ܒܓܘܪܢܝܬܐ . ܗܕܐ ܡܢܝܢ ܠܓܘܪܐ ܕܡܐ ܕܡܐ ܘܡܫܚܬܐ ܡܬܦܫܛܐ ܠܓܘܪܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ . ܘܒܠܒܝܬܐ ܕܦܘܪܫܢܐ ܕܪܕܝܐ ܡܢܦܘܫܝܐ . ܘܡܢ ܐܘܟܣܓܝܢ ܡܢ ܫܠܝܠܘܬܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ ܠܕܡܐ . ܡܢ ܪܕܝܐ ܡܢܦܘܫܝܐ ܝܠܗ ܠܗ ܐܠܒܝܘܠܝܘܢܝܬܐ (PO_2 = ١٠٠) ܠܪܕܝܐ ܡܢܦܘܫܝܐ ܕܗܘܐ ܠܗ ܕܡܐ (PO_2 = ٤٠) ܗܘܐ ܕܡܐ ܕܐܢܫܐ ܐܘܟܣܓܝܢ ܕܟܪܒܘܢ . ܡܢܝܢܐ ܒܓܘ ܦܘܪܫܐ . ܡܛܠ ܗܕܐ ܕܪܕܝܐ ܡܢܦܘܫܝܐ ܠܟܠ ܗܘܐ ܠܗ ܕܡܐ ܦܪܝܫܐ (PCO_2 = ٤٦) ܒܪܘܟܒ ٤٠ ܡܝܠܝܡܛܪܐ ܕܙܝܒܩ ܠܗ ܗܘܐ ܕܐܠܒܝܘܠܝܘܢܝܬܐ . ܘܠܗ ܡܢܝܢܐ ܕܡܫܚܬܐ ܕܕܡܐ ܠܗ ܒܓܘ ܕܡܐ . ܐܝܟ ܡܘܪܐ ܠܐܘܟܣܓܝܢ . ܘܐܝܟ ܪܕܝܐ ܡܢܦܘܫܝܐ ܕܡܛܝܐ ܠ ١٠٠ ܡܝܠܝܡܛܪܐ ܕܙܝܒܩ . ܐܝܟ ܕܡܠܝܬ ܠܡܘܪܐ ܐܝܟ ܕܡܐ ܒܪ̈ܘܚܐ ܕܐܘܟܣܓܝܢ . ܘܡܬܚܠܦ ܗܘܐ ܕ O_2 . ܘܡܛܝܐ ܪܕܝܐ ܡܢܦܘܫܝܐ ܠ ٤٠ ܡܠܡ ܕܙܝܒܩ ܠܗ ܕܡܐ ܒܪ̈ܘܚܐ . ܘܠܒܝܬܐ ܒܠ ܪܡܘܬܐ . ܐܝܟ ܕܗܘ ܒܪ̈ܘܚܐ ܝܠܗ ܡܢ ܡܫܚܬܐ ܗܕܐ :



ܡܚܘܝܢܐ ܡܫܘܕܥܐ ܠܟܠܝܬܐ ܫܘܚܠܦܐ ܕܓܘܫܡܐ ܘܢܦܫܐ ܠܗ ܪܐܬܐ

١١ - ٨ - ٢ - ܡܫܚܠܦܬܐ ܕܓܐܙܐ ܒܓܘ ܪܐܬܐ :

[illegible]
ܒܓܘ . ܥܛܦܐ ܫܘܚܠܦܬܐ ܕܟܝܢܐ . ܟܕ ܡܫܚܠܦܬܐ ܕܓܐܙܐ ܟܝ ܚܕܬܐ ܘܡܘܬܪܐ
. ܘܠܐܢܐ ܐܝܟ ܒܓܘ ܡܕܡ ܕܐܢܫܐ ܗܘܐ ܫܚܠܐ ܘܫܘܦܐ ܠܡܫܚܠܦܬܐ ܕܓܐܙܐ
ܡܫܬܢܝܐ ܡܘܬܪܐ ܡܢܬܢܝܐ ܠܓܐܙܐ . ܘܡܣܝܒܐ ܐܘܟܣܓܝܢ ($PO_2 = ١٠٠$) ܡܢ
ܕܡܐ ܠܚܘܪܬܐ ܕܚܘܪܬܐ ($PO_2 = ٤٠$) . ܘܡܗܘܕܥܐ ܕܠܐ PO_2 ܒܓܘ ܕܡܐ .
ܘܡܢܬܐ ܕܦܠܛܐ ܗܘ ܡܢ ܚܘܪܬܐ ܐܝܟ ܕܡܐ ܘܪܝܕܐ . ܡܛܠ ܕܡܢܬܐ ܡܢܬܢܝܐ ܠ
١٠ ܡܠܝܡܝܬܪܐ ܕܒܝܬ . ܘܡܗܘܕܥܐ ܕܗܘ . ܡܢܐ ܕܡܐ CO_2 ܡܢ ܚܘܪܬܐ . ܒܓܘ
ܡܫܚܠܦܬܐ ܕܡܫܚܠܦܬܐ ܕܓܐܙܐ . ܡܛܠ ܗܘܝܐ ܕܘܡܝܐ ܡܢܬܢܝܐ ܠܗܘܐ
ܗܘܐ ܒܓܘ ܕܡܐ ٤٠ ܡܠܝܡܝܬܪܐ ܕܒܝܬ . ܘܒܓܘ ܚܘܪܬܐ ٤٦ ܡܠܝܡܝܬܪܐ ܕܒܝܬ .
ܘܡܗܘܕܥܐ ܕܠܐ (PCO_2) ܒܓܘ ܕܡܐ ܕܪܝܕܐ ، ܗܘ ܕܥܒܪ ܕܡܐ ܠܘܬ
ܡܘܛܝܢܐ ܠܚܘܪܬܐ ܠܐܘܟܣܓܝܢ ܕܚܘܪܬܐ . ܕܪܝܐ ܡܢܬܢܝܐ ٤٦ ܡܠܝܡܝܬܪܐ
ܕܒܝܬ . ܘܟܕ ܦܫܝܛ ܡܫܝܚܬܐ ܕܗܘܐ ܡܕܡܘܠܩܘܠܝܬܐ ܠܡܢܬܐ .
ܡܫܚܠܦܘܬܐ ܕܡܫܚܠܦ ܗܘܐ ܡܕܡܘܠܩܘܠܝܬܐ . ܦܠܛ ܕܡܐ ܡܢ ܚܘܪܬܐ
ܠܐܢܫܐ . ܘܗܘ ܐܝܬܘܗܝ ܗܘ ܐܦ ܕܪܝܐ ܡܢܬܢܝܐ ܠܓܐܙܐ ܕܐܘܟܣܓܝܢ .
ܘܕܢܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ ܒܓܘ ܗܘܐ ܕܡܕܡܘܠܩܘܠܝܬܐ .

١٢ - ܢܫܡܬܐ ܚܘܪܝܬܐ (Celluar Respiration) :

ܒܠܘ ܡܫܚܠܦܘܬܐ ܣܘܓܝܐܐ . ܟܕ ܒܓܘ ܟܠܗ ܚܘܪܬܐ ܚܝܘܬܐ
ܠܚܘܕܬܐ ، ܘܫܪܟܐ ܡܫܚܠܦܬܐ ܕܐܘܪܚܐ ܗܘܝܐ ܡܛܠܬܐ . ܠܡܐܢܐ
ܦܫܝܛܐ ܠܢܫܐ ܕܦܠܛܬܐ ܕܚܝܘܬܐ ܡܣܝܒܬܐ ܒܓܘ ܐܝܢܐ ܕܐܘܪܚܐ . ܟܕ
ܗܢܐ ܚܘܪܬܐ ܠܚܝܘܬܐ . ܕܡܢܐ ܚܫܚܠܦܘܬܗ ܡܢ ܚܝܘܬܐ ، ܘܡܢܐ
ܚܘܪܬܐ ܟܕ ܡܣܝܒܬܗ ܡܢ ܚܝܘܬܐ . ܡܢ ܡܢܝܢܬܐ ܕܡܠܘܐܐ ܡܘܪܟܒܐ
ܡܛܠܬܐ ܚܫܚܠܦܘܬܐ ܕܢܫܡܬܐ ܚܘܪܝܬܐ . ܘܟܕ ܡܢܝܢܬܐ ܐܘ
ܥܠܬܐ ܕܡܠܘܐܐ ܡܘܪܟܒܐ . ܒܓܘ ܢܣܝܒܘܬܐ ܗܘܝܬܐ (ܚܝܘܬܐ
ܕܐܘܟܣܓܝܢ) ܐܘ ܠܐ ܗܘܝܬܐ (ܚܕܝܘܬܐ ܕܐܘܟܣܓܝܢ) . ܐܝܟ ܒܓܘ
ܚܘܪܬܐ ܗܕܐ ܐܝܬܐ ܡܢ ܦܠܓܘܬܐ ܒܠܚܘܕ :

ܡܒܢܝܢ : ܦܠܚܘܬܐ ܕܡܩܒܠ ܠܚܝܠܘܬܐ ܐܝܟ ܦܠܚܘܬܐ ܒܢܝܢܬܐ
ܢܓܘܡ ܒ̈ܢܝܐ ܕܟܪܒܘܗܝܕܪܐܬܐ ܘܦܪܘܛܝܢܐ ܘܡܫܚܐ .
ܫܪܝܢ : ܦܠܚܘܬܐ ܕܡܦܠܛ ܠܚܝܠܘܬܐ ܐܝܟ ܦܠܚܘܬܐ ܡܫܪܝܢܬܐ
ܢܓܘܡ ܫܪܝܬܐ ܕܟܪܒܘܗܝܕܪܐܬܐ ܘܦܪܘܛܝܢܐ ܘܡܫܚܐ .
ܘܦܠܚܢܐ ܗܠܝܢ ܡܬܩܪܝܢ ܒܚܘܠܦܐ ܕܓܘܪܐ ܕܡܠܘܐܐ ܗܘܪܡܢܝܐ . ܡܢ
ܐܡܬܝܢܘܬܐ ܠܐܢܫܝܐ ܒܚܘܠܦܐ ܗܘܪܡܢܝܐ ܐܘ ܗܘܫܠܦ ܚܝܐ (Metabolism
) . ܘܦܬܟܐ ܗܠܝܢ ܣܘܟܐ ܕܚܘܠܦܐ ܗܘܪܡܢܝܐ ܬܪܬܐ ܐܢܘܢ ܦܠܓܘܬܐ
ܢܦܩܬܐ . ܘܡܢ ܦܠܓܘܬܐ ܡܢ ܦܠܓܘܬܐ ܕܚܘܠܦܐ ܗܘܪܡܢܝܐ . ܐܝܟ ܕܐ
ܡܬܝܠܕ ܫܘܒܚܐ ܠܦܘܪܫܐ ܒܝܕ ܦܝܫܘܬܐ ܒܫܘܒܚܐ . ܘܡܬܩܪܐ ܗܢܐ
ܕܡܬܩܪܐ ܗܠܝܢ (ܒܫܠܝܐ ܐܘ ܗܕܡܐ (Catabolism)) . ܘܡܢܗ ܐܢܘܢ ܗܘܐ ܗܘܐ
ܠܐܢܐ ܒܦܠܚܘܬܐ ܕܚܝܘܬܐ . ܘܡܢ ܡܬܝܠܕ ܫܘܒܚܐ ܠܚܕܐ ܓܘܪܬܐ ܒܝܕ
ܡܬܦܠܚܬܐ ܒܫܘܒܚܐ . ܘܡܬܩܪܐ ܗܢܐ ܕܡܬܩܪܝܢ ܗܠܝܢ ܒܒܢܝܢܐ (Anabolism) ،
ܘܡܢܗ ܐܢܘܢ ܗܘܐ ܠܐܢܐ ܒܡܬܢܦܬܐ ܕܚܝܘܬܐ .
ܘܠܐ ܗܠܝܢ ܢܬܒܥܐ ܕܢܬܒܝ ܐܘ ܒܡܬܐ ܦܠܚܘܬܐ ܐܝܟ ܕܡܩܒܠ ܚܝܠܘܬܐ
ܗܢ ܒܗܝ ܢܬܒܥܐ ܕܢܬܒܝ ܒܗ ܦܠܚܘܬܐ ܐܝܟ ܕܡܦܠܛ ܚܝܠܘܬܐ . ܘܡܢ
ܕܐܗܐ ܒܡܬܐ ܚܕܐ ܐܝܟ ܐܘ ܡܬܝܠܕܐ ܠܡܦܫܬܐ ܒܪܢܬܐ ܠܚܝܠܘܬܐ . ܐܘ
ܫܘܒܚܐ ܒܡܢܝܢܐ ܕܠܚܝܢܐ . ܘܡܢ ܕܟܐ ܕܐܢܐ ܫܘܒܚܐ ܐܝܟܘܬܗܝܢ ܗܠܝܢ
ܦܘܫܩܐ (ATP) . ܘܡܢ ܕܐܗܐ ܒܡܣܘܬܐ ܕܡܢܐ ܕܦܬܚܐ ܡܬܬܠܡܕܐ ܡܢ
ܗܘܦܟܐ ܦܠܓܐ . ܗܘ ܕܝܢ ܡܠܠܐ . ܘܡܩܪܒܐ ܕܗܘܘܚܕܐ ܡܢܡܕܐ ܐܢܘܢ
ܗܘܦܟܐ ܙܒܢܐ . ܐܝܟ ܗܢܐ ܠܚܘܕܐ ܡܢ ܗܘܦܟܐ ܕܗܘܘܚܕܐ . ܦܝܫ
ܡܬܬܠܡܕ ܒܡܫܡܫܢܐ ܕܡܫܡܫܘܬܐ ܕܐܫܬܠܡ ܗܘܦܟܐ .
ܘܠܐ ܦܝܫ ܢܬܒܥ ܡܠܘܐܐ ܗܘܪܡܢܝܐ ܒܚܕܐ ܐܢܘܢ . ܐܠܐ ܒܓܘܪܬܐ
ܕܒܢܝܬܐ ، ܘܒܐܡܬܝܢܘܬܐ ܕܦܠܓܘܬܐ ܐܘܡܢܘܬܐ ܡܬܒܣܡܢܘܬܐ . ܗܟܢ
ܒܡܬܬܙܝܥܐ ܕܡܠܘܐܐ ܦܝܫܐ . ܘܡܬܟܝܢ ܗܢܐ ܟܪܒܘܗܝܕܪܐܬܐ ܐܝܟ ܡܠܘܐܐ
ܒܝܕ ܐܢܙܝܡܐ ܡܬܦܠܚܢ ܠܐܘ ܒܠܚܘܕ . ܟܕ ܡܬܝܠܕ ܟܪܒܘܗܝܕܪܐܬܐ ܠܓܠܘܩܘܙ
ܦܝܫܬܐ (ܓܠܘܩܘܙ) . ܘܡܬܐ ܗܢܘܢ ܦܝܫ ܡܬܩܒܠܐ ܐܘ ܡܬܚܠܦܘܬܐ
ܕܚܝܘܬܐ . ܘܡܬܦܩܐ ܠܟܪܒܘܗܝܕܪܐܬܐ . ܟܠܗ ܦܝܫ ܡܬܦܠܚܐ ܡܢܗ

ܡܢ ܚܕܐ ܕܡܫܠܛܝܢ ܠܫܘܘܝܐ ܡܫܚܢܐ ܘܠܠܫܢܝܢ . ܘܐܦ ܦܪܝܢ ܡܘܦܩܝܢܐ ܟܪܘܒܝܢܐ ܡܢ ܚܕܐ ܕܦܪܝܢ ܡܘܦܩܝܢܐ ܠܫܘܘܝܐ ܐܚܪܝܢܐ .

ܘܢܫܝܡܬܐ ܗܠܝܢ ܡܬܦܘܫܬܐ ܗ̈ܘܢܝܘܬܐ ܕܢܫܝܡܘܬܐ ܗܝ ܕܫܒܥܐ ܡܬܠܝܐ ܕܐܘܟܣܓܝܢ ܕܗܘܐ ܐܝܬܝܐ ܒܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ (Aevobic respiration) ܐܝܟ ܐܝܟܐ ܕܐܝܬ ܚܝܘܬܐ ܐܚܪܢܝܐ . ܘܥܒܕ ܒܢܝܢ ܐܪܥܐ ܕܝܠܦܢܐ ܡܢ ܢܫܝܡܘܬܐ . ܕܠܐ ܠܗ ܥܕܠܐ ܒܗܘ ܐܝܬܘܬܐ ܕܐܘܟܣܓܝܢ . ܘܥܠ ܕܐܝܟ ܗܘܐ ܦܪܝܢ ܡܬܘܡܘܬܐ ܒܢܫܝܡܘܬܐ ܠܐ ܗܘܐܢܝܬܐ (Anaero - bicrespiration) ܐܘ ܚܡܝܥܘܬܐ (Fermentation) . ܘܡܬܦܪܫ ܗ̈ܘܢܝܘܬܐ . ܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ ܘܢܫܝܡܘܬܐ ܠܐ ܗܘܐܢܝܬܐ . ܡܛܠ ܕܡܦܩܐ ܕܚܝܠܐ ܕܠܠܝܗܘܢ ܦܪܝܫܐ . ܐܘ ܚܕܡܢܐ ܗܦܟܝܢ ܠܡܬܚܘܝܘܬܐ ܒܝܕ ܓܠܘܟܘܙܐ . ܡܛܠ ܚܕ ܡܢܝܢܐ ܒܝܕ ܬܪܘܟܐ ܡܢ ܝܬܪܐ ܕܚܝܠܐ . ܘܠܐ ܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ ܦܠܓܝܢ ܒܚܕܐ ܝܬܪܐ ܕܚܝܠܐ . ܠܣܘܓܐܐ ܒܐܘܟܣܝܕܘܬܐ ܕܡܬܚܘܝܘܬܐ ܕ CO_2 . ܐܝܟܢܐ ܕܐܝܬ ܗ̈ܘܢܝܘܬܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܐܢܝܬܐ . ܦܠܓܝܢ ܚܕܡܢܐ ܝܬܪܐ ܕܚܝܠܐ ܕܠܠܝܗܘܢ . ܒܐܘܟܣܝܕܘܬܐ ܕܡܬܚܘܝܘܬܐ ܒܝܕ ܓܒܝܠܬܐ . ܘܒܬܪܟܢ ܠܗܘܦܟܐ ܒܐܘܟܣܝܕܘܬܐ ܕܟܘܗܠܐ ܐܬܝܠܝܐ (C_2H_5OH) . ܐܘ ܒܚܕܡܢܐ ܐܚܪܢܐ ܒܬܪܟܢ ܘܠܗܠܝܢ ܐܝܟ ܫܘܘܝܐ ܕܠܚܡܝܥܐ . ܘܥܠ ܗܘ ܒܘܠܚܕܐ ܕܡܬܚܘܝܐ ܗܦܟܐ . ܐܝܟ ܗܕܐ ܗ̈ܘܢܝܘܬܐ ܕܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ ܘܠܐ ܗܘܐܢܝܬܐ ، ܗܦܟܝܢ ܕܡܬܚܘܝܢ ܠܗ ܡܢ ܓܒܪܐ ܕܐܝܟܐ .

١٢ ـ ١ ـ ܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ Aeroic respiration :

ܒܗܝ ܕܥܒܕܐ ܕܚܝܘܬܐ ܡܫܡܠܝܐ ܠܗ ܡܢܘܠܐ ܕܦܥܠܝܘܬܐ ܚܝܘܬܢܝܬܐ ܠܐܝܟܢܝܬܐ ܕܝܠܗܝܢ ܗܕܡܐ . ܒܐܝܬܘܬܐ ܕܐܘܟܣܓܝܢ ܠܗ ܗ̈ܘܢܝܘܬܐ ܕܢܫܝܡܘܬܐ ܗܘܐܢܝܬܐ . ܡܢ ܚܕܐ ܡܬܚܘܝܘܬܐ ܠܚܝܘܬܢܝܬܐ ܐܝܟ ܝܬܪܐ ܘܠܚܡܝܢ ܠܚܕܢܝܬܐ ܘܦܢܝܬܐ ܐܝܟ ܫܠܡܐ ܘܠܚܡܐ ܘܚܝܠܗ ، ܒܝܕ ܐܘܟܣܓܝܢ ܕܠܗܘܢ . ܘܡܫܠܛܝܢ ܥܒܕܝܬܐ ܕܦܢܝܬܐ ܠܢܦܫܬܐ ܚܕܢܝܬܐ ܐܝܟ ܠܚܡܐ ܘܬܪܡܠܐ ܘܓܠܘܟܘܙ ، ܘܥܠ ܕܥܒܕܐ ܕܚܝܘܬܐ ܡܬܚܘܝܢܝܬܐ ܕܠܠܝܗܘܢ ܡܬܘܡܐ ܠܗܘܦܟܐ ، ܐܝܟ ܚܕܡܢܐ ܡܫܬܡܠܝܐ ܒܟܠ ܫܘܘܝܐ

ܡܥܒܕܢܐ ܐܘ ܚܡܘܨܐ ܐܚܪܢܐ ܐܝܟ ܡܫܒܚܬܐ ܠܚܘܣܟܐ. ܘܟܠ ܕܐܗܐ ܡܬܢܣܒܐ ܠܗ ܢܦܫܐ ܕܫܚܘܪܘܬܐ ܕܢܦܝܫܘܬܐ ܗܘܡܬܐ ܗܝ ܐܗܐ ܬܘܩܠܬܐ :

$$C_6H_{12}O_6 + 6O_2 \longrightarrow 6C_2 + 6H_2O + 673\text{K - ail}$$

ܬܘܩܦܐ ܡܝܐ ܟܪܒܘܢ ܐܘܟܣܝܕܐ ܐܘܟܣܓܝܢ ܫܟܪܐ ܕܓܠܘܩܘܙ ܕܥܢܒܐ

ܘܡܬܚܙܝܐ ܐܝܟ ܬܘܩܦܐ ܦܠܝܓܐ ܠܘܬ ܬܘܩܦܐ ܟܝܡܝܐܝܐ ܘܬܘܩܦܐ ܚܡܝܡܘܬܢܝܐ.

ܘܬܘܩܠܬܐ ܡܘܕܥܢܝܬܐ ܠܝܬ ܠܗ ܠܗ ܡܬܚܘܝܐ ܐܢܫܘܬܐ ܐܘ ܚܢܘܬܐ ܕܦܠܝܓܘܬܐ ܡܬܦܪܢܣܬܐ ܐܝܟ ܕܒܬܪ ܠܗ ܫܘܬܦܘܬܐ ܕܢܦܝܫܘܬܐ.

ܫܒܝܠܐ ܗܘ ܫܘܬܦܘܬܐ ܦܢܝܬܐ ܡܚܝܢܬܐ ܘܡܬܠܬܠܝܬܐ. ܡܬܢܣܒܐ ܠܗ ܡܦܠܓܝܢ ܠܬܠܬܐ ܡܢܝܢܐ ܝܠܝܕܐ :

١ - ܫܒܝܠܐ ܕܓܠܘܩܘ. ܠܐ ܗܘܝܐ ܐܘ ܫܪܝܬܐ ܫܬܪܝܬܐ (Glycolysis).

ܘܫܪܝ ܐܝܟ ܫܒܝܠܐ ܚܕܐ ܝܥܠܬܐ ܡܢ ܦܠܝܓܘܬܐ ܐܘܟܣܓܢܝܬܐ ܢܦܝܫܢܝܬܐ. ܡܬܚܝܠ ܒܚܕܬܐ ܠܦܠܝܓܘܬܐ ܐܘ ܫܪܝܬܐ ܕܡܢܬܘܢܝܬܐ ܕܫܟܪܐ ܕܓܠܘܩܘ ܠܬܪܬܝܢ ܡܢܬܘܢܝܬܐ ܡܢ ܚܡܘܨܐ ܕܦܝܪܘܦܝܢ. ܘܐܗܐ ܝܥܠܬܐ ܡܢ ܦܠܝܓܘܬܐ ܠܐ ܡܦܠܚ ܐܘܟܣܓܝܢ. ܟܠ ܕܐܗܐ ܐܝܟ ܝܠܝܕ ܦܠܝܓܘܬܐ ܠܐ ܗܘܝܬܐ. ܘܫܪܝܐ ܠܗ ܫܘܬܦܠܝܬ ܕܫܘܪܝܐ. ܘܫܪܝܐ ܐܝܟ ܦܠܝܓܘܬܐ ܡܫܬܪܝܬܐ ܕܡܢܬܘܢܝܬܐ ܕܓܠܘܩܘ ܫܬܝܬܝܬܐ ܠܝܬܪܐ ܕܟܪܒܘ (6C). ܒܐܘܪܚܐ ܕܦܘܣܦܪܬܐ. ܘܫܬܪ ܗܘܝ ܫܠܡܬܐ ܠܡܢܬܘܢܝܬܐ ܕܦܪܘܩܛܘ ܡܦܘܣܦܪܬܐ. ܢܦܩܐ ܗܘ. ܦܠܝܓܘܬܐ ܕܡܢܬܘܢܝܬܐ ܕܦܪܘܩܛܘ ܡܦܘܣܦܪܬܐ ܫܬܝܬܝܬܐ. ܠܝܬܪܐ ܕܟܪܒܘ. ܠܬܪܬܝܢ ܡܢܬܘܢܝܬܐ ܬܠܝܬܝܬܐ ܝܬܪܐ ܕܟܪܒܘ (3C). ܘܫܠܡܝܢ ܬܪܬܝܢ ܐܫܬܝܬܐ ܫܪܝܐ ܝܥܠܬܐ ܡܢ ܦܠܝܓܘܬܐ. ܠܬܪܬܝܢ ܡܢܬܘܢܝܬܐ ܡܢ ܚܡܘܨܐ ܕܦܝܪܘܦܝܢ ܬܠܝܬܝܬܐ ܝܬܪܐ ܕܟܪܒܘ (3C). ܘܬܘܒ ܠܐܝܬ ܫܘܠܛܐ ܬܘܪܨܝܐ. ܦܠܓܬܐ ܕܚܕܐ ܡܢܬܐ ܡܢ ܬܘܩܦܐ ܕܐܝܬ ܐܝܬܝܗ ܒܗ ܡܢܬܘܢܝܬܐ ܕܫܟܪܐ ܕܓܠܘܩܘ. ܗܘ ܕܦܝܫ ܡܬܘܡܝܬܐ ܒ ٦٧٣ ܫܘܪܢܬܐ. ܠܫܒܠ ܟܠܗ ܡܢܬܘܢܝܬܐ ܒܪܬܐ. ܘܡܦܪܫܬܐ ܕܫܪܝ ܬܘܡܐ ܡܢ ܐܗܐ ܬܘܩܦܐ. ܒܗ ܪܘܚܐ ܕܒܠܝܐ. ܡܬܦܫܛܐ ܒܗ ܬܪܬܝܢ ܡܢܬܘܢܝܬܐ ܡܢ ܐܕܝܢܘܣܝܢ

ܗܠܝܢ ܦܘܣܦܛܐ (P ٨ 2) . ܘܡܛܠ ܗܢܐ ܣܓܝ ܐܝܬ ܥܒܝܕܬܐ ܕܚܕܪܘܢ،
ܚܕܡܢܐ ܗܘ ܐܝܬ ܟܥܒܝܕܬܐ ܕܐܡܒܕܢ ـ ܡܝܪܗܘܦ (Embden Meyerhof Pathway) .
ܡܕܡ ܕܒܥܒܕܬܐ ܕܫܘܚܠܦܐ ܠܓܘܕܬܐ ܕܣܘܟܪܐ ܕܓܠܘܩܘܙ ، ܡܬܩܪܝܐ
ܒܓܘܕܬܐ ܕܚܕܪܘܢ . ܘܠܐ ܕܡܬܚܫܚ ܠܐܘܟܣܓܢܐ ܕ (ܐܟܣܝܓܢ ـ ܐܘ) ، ܘܗܘ
ܕܩܝܡ ܡܬܥܒܕܐ ܒܓܘܫܡܐ ܕܡܚܝܠܐ ܠܐܝܬܐ ܕܓܘܕܬܐ .

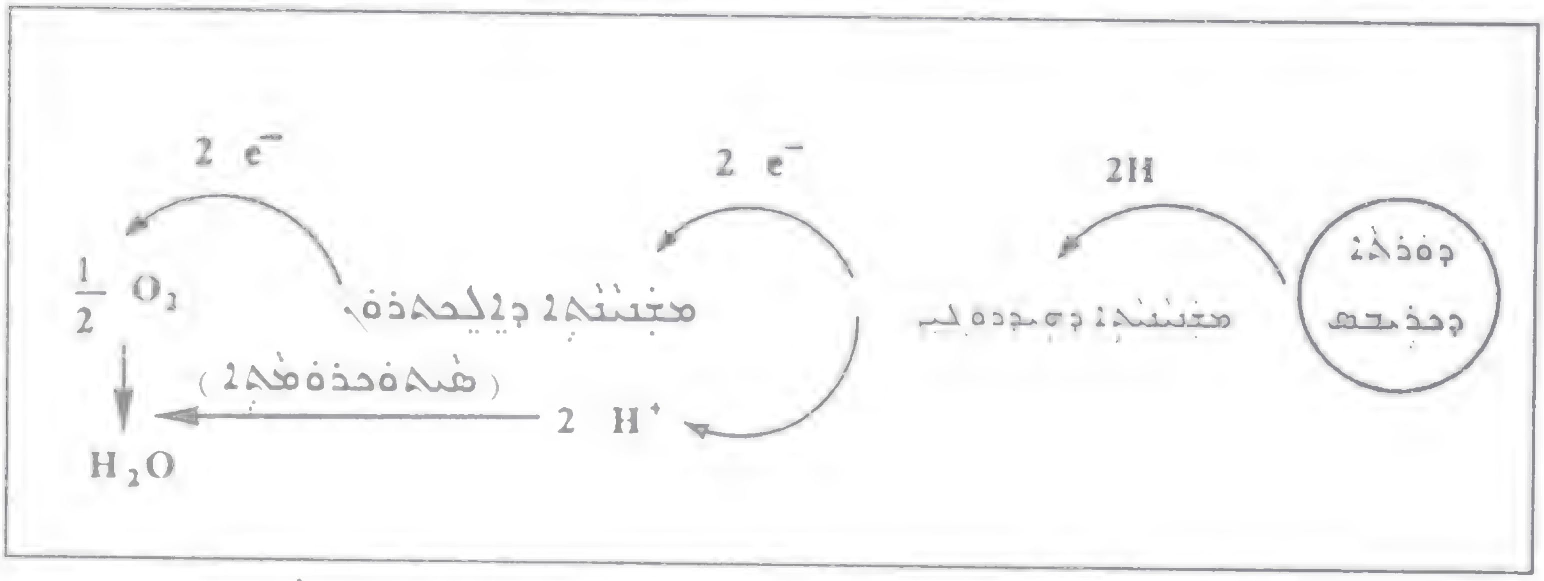
ܗܘܦܟܐ ܦܠܝܓܐ ܒܐܝܬ ܥܒܝܕܬܐ ܠܐ ܗܘܝܐ ܡܦܠܚܢ (٨) ܡܢܬܘܬܐ ATP ܦܠܣܘܦ ، ܠܟܠ ܡܢܬܘܬܐ ܕܠܘܚܘ ، ܐܝܬܐ ܐܝܬ ܗܘܦܟܐ ܠܐ ܝܠܗ ܡܠܐܟܐ ܠܡܘܕܥܬܐ ܕܐܝܬܝܗ ܚܝܐ ܒܗܘܦܟܐ ، ܗܘ ܕܗܝܡܢܐ ܝܠܗ ܐܝܠܗ . ܘܐܠܐ ܦܠܚܬܐ ܟܠ ܚܕ ܥܒܝܕܬܐ ܡܕܪܐ ܡܢܝܢܬܐ ܒܝܕ ܕܒܬܐ . ܠܡܦܪܢܣܬܐ ܕܗܘܦܟܐ ܒܝܕ ܕܝܕܥܬܐ ، ܒܐܘܪܚܐ ܕܦܪܝܫܘܬܐ ܕܗܘܪܡܢܐ ܦܪܝܫܬܐ ܠܡܝܬܪܬܐ . ܠܚܠܡܬܐ ܕܡܢܐ ܕܐܝܬ ܒܝܗ ܡܢ ܗܘܦܟܐ ، ܒܐܘܪܚܐ ܕܐܫܟܚܬܐ ܗܘܝܬܐ ܠܚܡܘܨܐ ܕܦܪܘܩܝܢ ܒܐܝܬܘܬܐ ܕܐܘܟܣܝܓܢ .

٢ . ܥܒܝܕܬܐ ܕܚܕܪܘܢ ܗܘܝܐ . ܐܘ ܕܘܪܬܐ ܕܚܡܘܨܐ ܕܣܝܛܪܝܢ (Citric Acid Cycle) : ܫܡܝܥ ܐܝܬ ܥܒܝܕܬܐ ܚܕܐ ܝܬܝܪܬܐ ܡܢ ܦܠܚܘܬܐ ܕܟܝܢ ܠܗ ܡܬܦܪܫܢܝܬܐ . ܘܡܛܠ ܗܢܐ ܡܬܩܡܘ ܐܝܟ ܦܠܚܘܬܐ ܒܓܘܕܬܐ ܕܚܡܘܨܐ ܕܣܝܛܪܝܢ ، ܡܛܠ ܚܡܘܨܐ ܕܣܝܛܪܝܢ ܝܠܗ ܗܘ ܚܡܘܨܐ ܩܕܡܝܐ ܕܟܕܪܐ ܠܗܘ . ܘܐܦ ܡܬܩܪܝܐ ܝܠܗ ܒܫܡܐ ܕܘܪܬܐ ܕܟܪܝܒܣ Krebs Cycle ܒܫܡܐ ܠܝܕܘܥܐ ܕܫܡ ܡܫܟܚܝܢ ܠܗܐ ܡܕܡܢܐ .

ܘܠܗ ܐܝܬ ܥܒܝܕܬܐ ، ܟܕ ܚܡܘܨܐ ܕܦܪܘܩܝܢ (ܘܗܘ ܕܝܠܗ ܦܠܓܐ ܐܚܪܢܐ ܠܗ ܥܒܝܕܬܐ ܕܚܕܪܘܢ ، ܠܐ ܗܘܝܐ) ܟܕ ܡܫܬܠܡ ܠܐܘܟܣܓܢܐ (ܐܟܣܝܓܢ ـ ܐܘ) ، ܠܗ ܝܬܝܪܬܐ ܡܢ ܦܠܚܘܬܐ ܡܬܦܪܫܢܝܬܐ ، ܟܠ ܦܠܚܘܬܐ ܡܢܗܘܢ ܐܝܬܠܗ ܐܢܙܝܡܐ ܕܝܠܢܝܐ ، ܘܡܫܡܫܢܐ ܡܢܬܘܬܐ ܕܚܡܘܨܐ ܕܦܪܘܩܝܢ ، ܠܗ ܦܠܚܘܬܐ ܕܐܝܬܐ ܕܓܘܕܬܐ ، ܕܡܦܠܚܢܐ ܬܪܬܝܢ ܡܢܬܘܬܐ ܡܢ CO 2 ܘ (٤) ܙܘܓܐ ܡܢ ܝܬܝܪܐ ܕܗܝܕܪܘܓܝܢ (2H) : ܐܪܒܥ ܦܘܠܓܐ ܕܐܫܟܚܬܐ .

٣ . ܥܒܝܕܬܐ ܕܡܬܚܠܦܘܬܐ ܕܐܠܩܛܪܘܢ . ܐܘ ܗܝܕܪܘܓܝܢ : ܘܡܛܠ ܝܠܗ ܡܬܩܡܘ ܐܝܬ ܥܒܝܕܬܐ ܝܬܝܪܬܐ ܢܦܫܘܬܢܝܬܐ Respiratory Chain ، ܟܕ ܡܬܚܝܒ

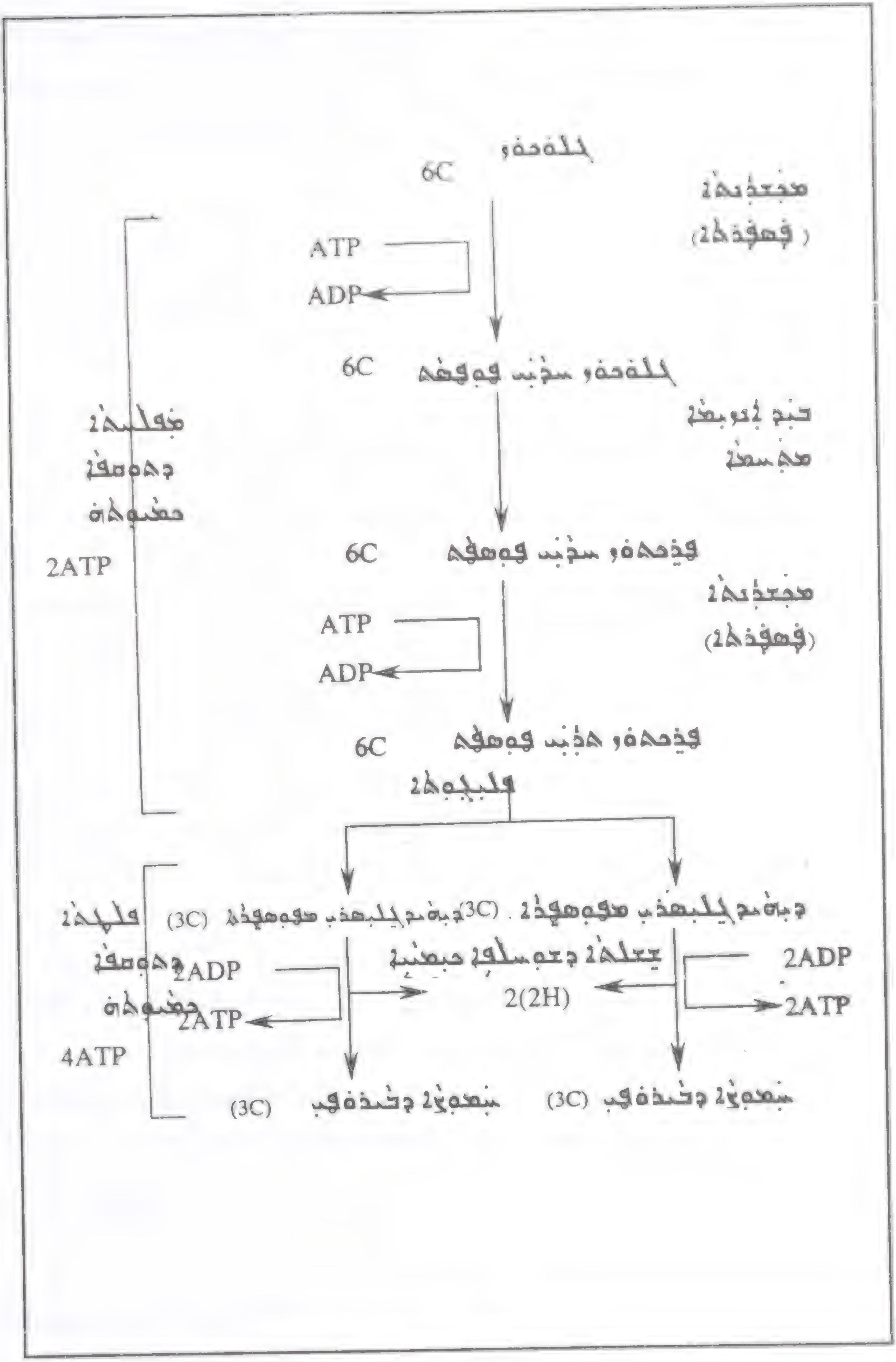
ܘܗܠܝܢ ܕܝܠܗܝܢ ܕܡܝܬܘܟܘܢܕܪܝܘܢ ܩܠܝܠܬܐ ܡܢ ܐܢܙܝܡܐ ܕܫܘܫܠܬܐ ܕܐܟܣܕܘܟܣܝܢ ،
ܠܗ ܕܦܪܬܐ ܕܫܘܫܠܬܐ ܕܬܢܦܣܝܢ . ܡܢ ܠܗ ܚܕܐ ܓܒܠܬܐ ܡܢ ܡܬܚܠܦܢܐ
ܠܡܫܠܡܘ ܐܠܟܬܪܘܢܝܢ ، ܗܘ ܕܡܫܝܢ ܫܡܗ ܡܬܪܘܨܐ ܡܢܐ .

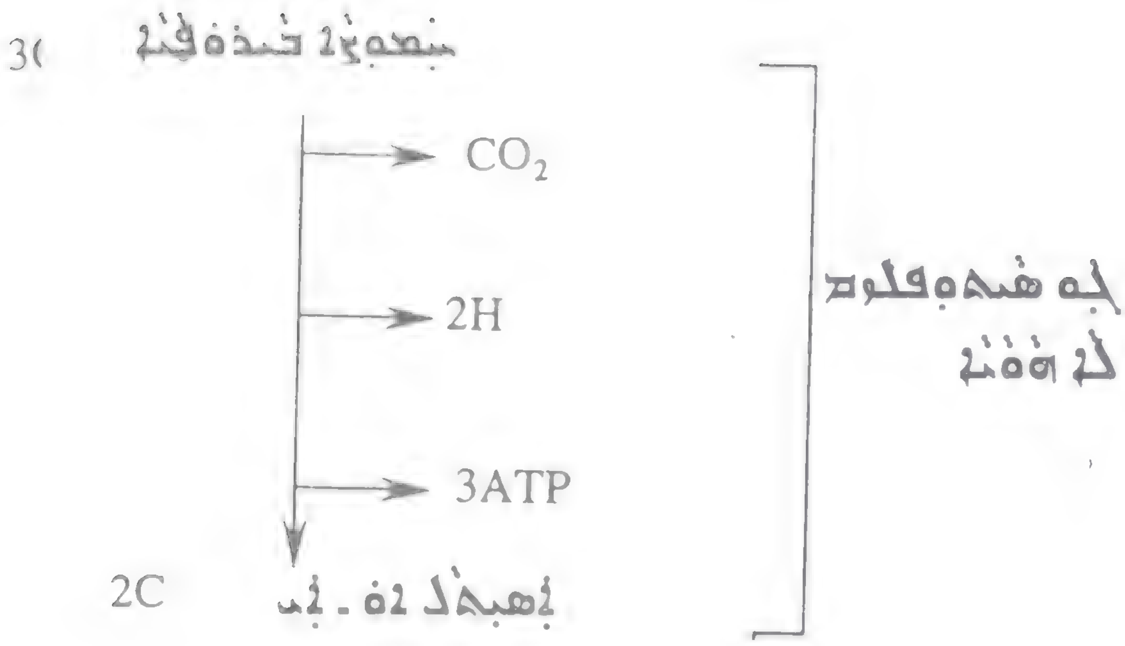


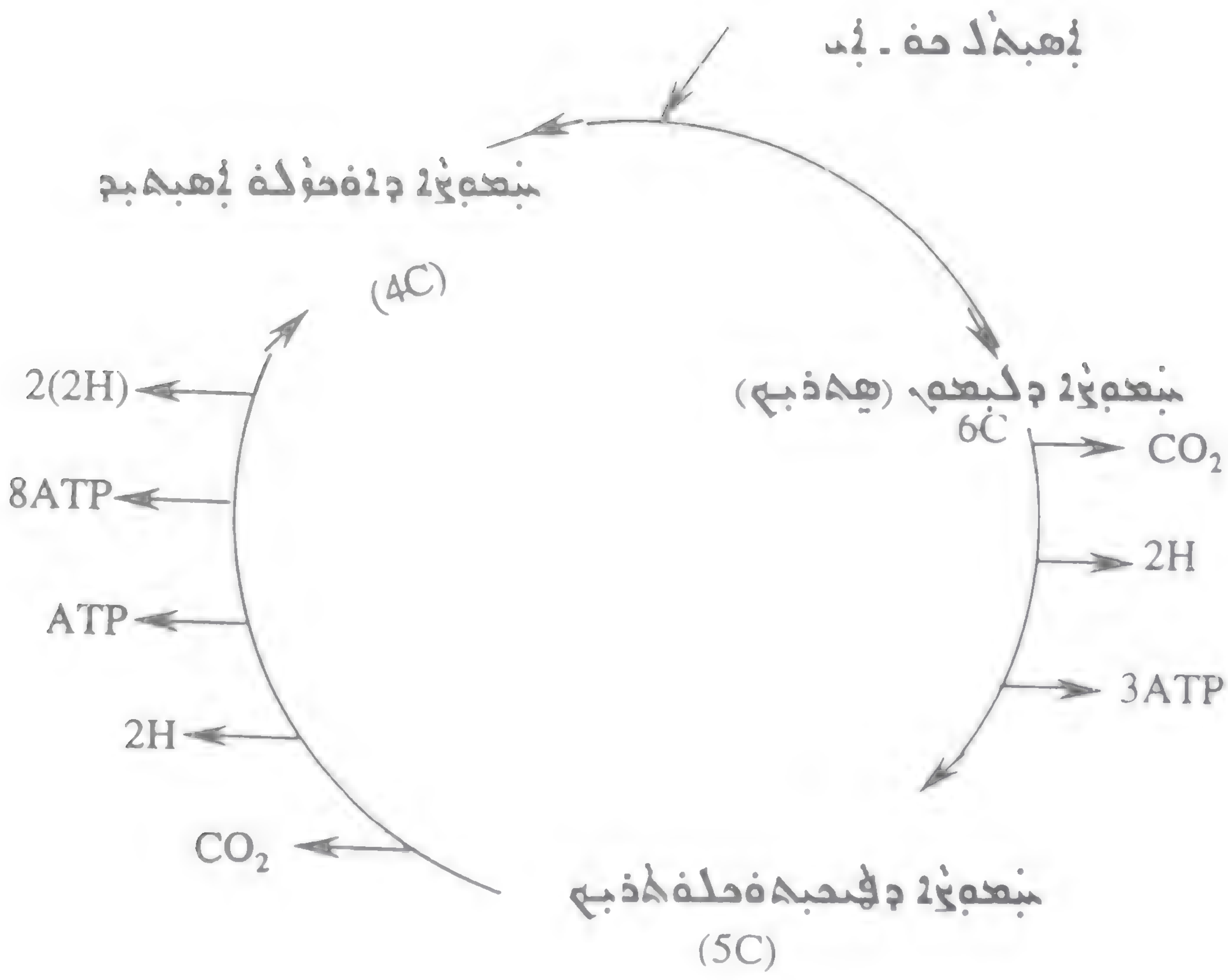
ܡܫܪܛܐ ܡܢܗܘܪܐ ܠܓܒܠܬܐ ܢܦܫܘܬܢܝܬܐ

ܘܐܝܟ ܕܝܕܝܥ ܡܫܘܕܪܐ ܠܗ ܗܝܕܪܘܓܝܢ ܡܢ ܐܠܟܬܪܘܢܝ (e) ܘܦܪܘܛܘܢ (H^+) ،
ܘܟܠ ܚܕ ܡܢ ܐܠܟܬܪܘܢܝ ܡܫܬܠܚܝܢ ܠܡܬܚܠܦܢܐ ܕܐܠܟܬܪܘܢܝ ܘܒܠܚܘܕ (
ܣܝܛܘܟܪܘܡܐ) ، ܒܕ ܓܒܠܬܐ ܦܪܘܛܝܢ ܗܠ ܕܡܛܝܐ ܠܐܘܟܣܓܝܢ (ܗܘ ܕܠܗ ܡܩܒܠܢܐ
ܐܚܪܝܐ ܠܐܠܟܬܪܘܢܝ ܠܗ ܓܒܠܬܐ ܢܦܫܘܬܢܝܬܐ) ، ܘܡܫܝܢ ܐܘܟܣܓܝܢ ܥܡ ܐܠܟܬܪܘܢܝ (e
) ܘܦܪܘܛܘܢ (H^+) ܒܕ ܡܬܪܘܨܐ ܡܪܟܒܬܐ ܕܡܝܐ (H_2O) ، ܘܡܢ ܠܗ ܫܘܢܝܬܐ
ܕܡܬܚܠܦܢܐ ܕܐܠܟܬܪܘܢܝ ܠܗ ܕܗܘܐ ܓܒܠܬܐ ، ܦܠܛ ܚܝܠܐ ، ܗܘ ܕܩܐܡ ܡܦܩܬܐ ܠܗ
ܕܡܬܚܙܐ ܝܠܗ ܚܝܠܐ (ATP) ، ܘܡܬܩܪܐ ܗܠܗ ܡܪܟܒܢܝܬܐ (ATP) ܠܟܠ ܓܒܠܬܐ
ܢܦܫܘܬܢܝܬܐ . ܩܐܡ ܡܦܪܢܐ ܠܗ ܥܒܠܐ ܗܘܢܐ ٣٠ ܡܪܟܒܢܝܬܐ ܡܢ (ATP) . ܘܟܠ
ܕܗܘܐ ܚܝܠܐ ܦܪܐ ܡܢ ܐܢܙܝܡܐ ܕܡܪܟܒܬܐ ܕܓܠܘܩܘܙ ܝܠܗ ܚܕܐ ܐܢܙܝܡܐ ܠܥܒܕܬܐ
، ܠܗܘܢܝܗ ܐܘܟܣܝܕܐ ܕܟܪܒܣ ، ܘܡܢܐ ܬܪܝܢ ٣٨ ܡܪܟܒܢܝܬܐ ܕ (ATP) ܘ (١٢) ܘܗܠܝܢ
ܡܢ ܝܬܪܐ ܕܗܝܕܪܘܓܝܢ ܘ (٦) ܡܪܟܒܢܝܬܐ ܡܢ CO_2 . ܘܐܦ ܒܕܟܠܝܢ ܕܦܠܛܐ ܕܚܝܠܐ
ܡܦܩܬܐ ܠܗ ܡܪܟܒܬܐ ܕ ATP ܚܕܐ ، ܩܐܡ ܡܬܚܫܒܢܐ ܒܝܢ ٨٠٠٠ - ١٢٠٠٠ ܟܠܘܪܝܐ ،
ܡܛܘܠ ܗܕܐ ܝܕܝܥܐ ܡܟܢܫܬܐ ܕܚܝܠܐ ܡܬܚܪܐ ، ܗܘ ܕܦܠܛ ܡܢ ܚܕܐ ܡܪܟܒܬܐ
ܕܓܠܘܩܘܙ ، ܘܗܝ ܕܡܫܘܚܬܐ ܠܗ ܓܒܠܬܐ ܕܚܝܘܬܐ ܡܢܗ ܠܗ ܒܟܢܘܫܐ ܚܫܘܒܢܐ ܠܦܓܪܐ
ܘܡܬܒܥܝܐ ܡܢ ܡܬܚܠܦܢܘܬܐ ܚܫܘܒܢܐ ܠܦܓܪܐ ܐܝܟ ܙܘܥܐ ܘܕܝܢܐ ܘܦܪܢܣܬܐ ܘܚܝܠܐ
ܘܡܬܒܥܝܐ ܡܢ ܡܬܚܠܦܢܘܬܐ ܚܫܘܒܢܝܬܐ . ܐܦ ܚܕ ܡܫܘܚܐ ܡܢ ܚܝܠܐ ܩܠܝܠܐ ܩܐܡ
ܡܬܦܠܛܐ ܒܡܫܚܢܐ ܕܚܡܝܡܘܬܐ ܕܡܬܚܫܒܐ ܠܦܓܪܐ ، ܘܡܛܠܐ ܠܫܘܚܠܦܐ ܕܦܓܪܐ ܕܫܘܝܘܬܗ ،
ܘܦܪܫܐ ܝܠܗ ܡܬܚܫܒܢܐ ܐܘܢܐ ܚܝܠܐ ܒܐܝܟ ٤٥% ܡܢ ܚܝܠܐ ܟܠܢܝܐ ܩܠܝܠܐ ܡܢ
ܡܪܟܒܬܐ ܕܓܠܘܩܘܙ :

ܘܡܫܘܚܬܐ ܝܠܗ ܡܩܡܬܐ ܕܟܠܝܘܬܐ ܕܢܦܫܘܬܐ ܗܘܝܐ ܘܐܝܟ ܕܒܬܪܐ ܝܠܗ :


6C
ATP
ADP
6C
6C
2ATP
ATP
ADP
6C
(3C)
(3C)
2ADP
2ATP
2(2H)
2ADP
2ATP
4ATP
(3C)
(3C)





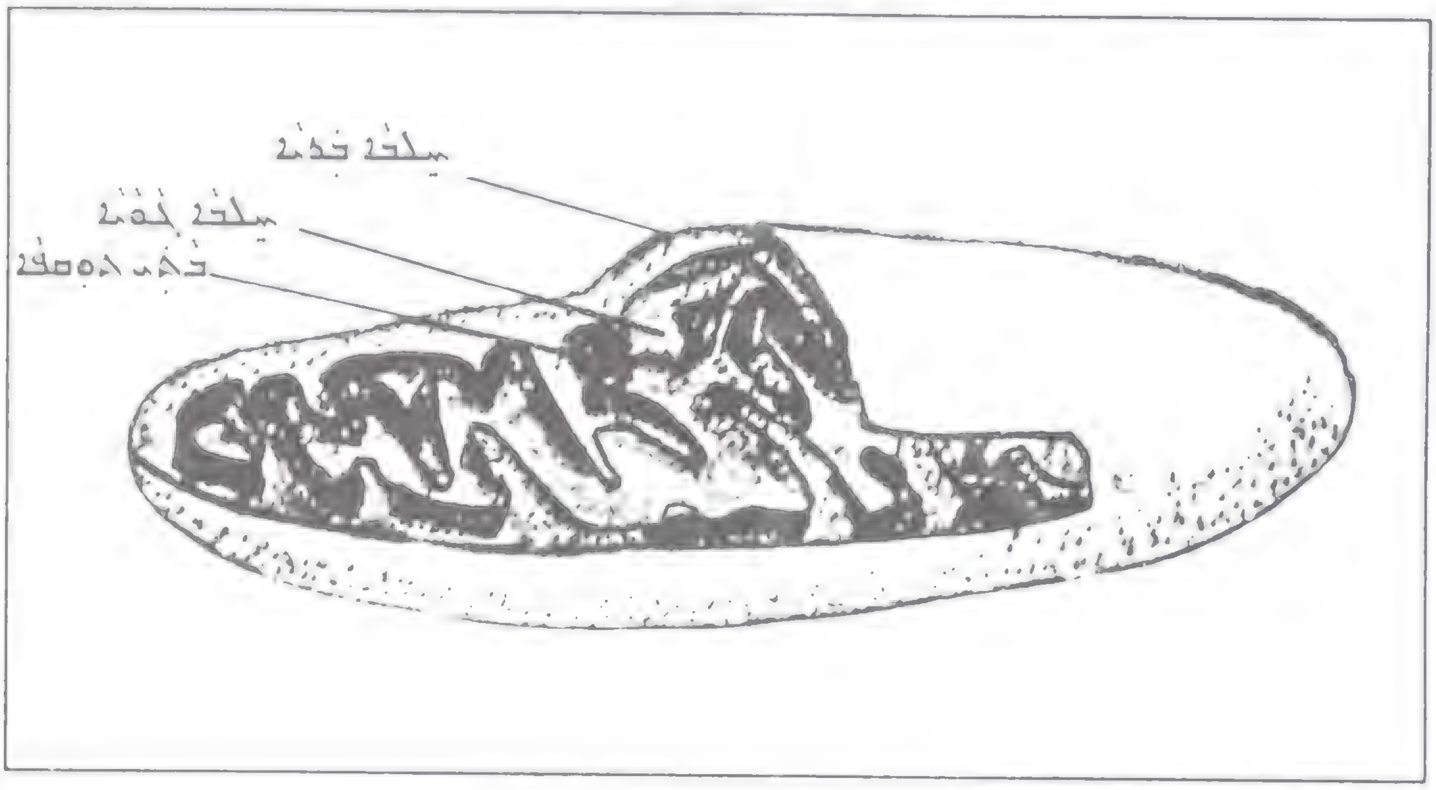
(ܕܘܪܐ ܕܟܪܒܣ)

١٢ . ٢ — ܪܘܟܒܐ ܕܡܝܛܘܟܘܢܕܪܝܐ ܘܐܘܡܢܘܬܗ ܒܡܦܩܢܘܬܐ ܕܬܘܩܦܐ :

ܡܘܕܝܥܠ ܕܟܠܗ ܦܠܚܘܬܐ ܕܝܘܕܥܬܐ ܕܥܕܡܝܗ ܘܡܬܚܠܬܐ ܢܦܫܘܬܢܝܬܐ ، ܒܕܝ ܕܝܠܗ ܡܝܛܘܟܘܢܕܪܝܐ ، ܗܢܐ ܘܡܢ ܒܗܕ ܕܒܕܢܐ ܡܬܘܥܘܬܐ ܕܥܕܢܐ ܒܥܕܢܐ ܠܓܘܫܡܗ ، ܠܗ ܡܬܘܦܠܛܐ ، ܗܘ ܕܒܥܕܐ ܡܝܢܗ . ܗܘܝܐ ܕܡܫܘܚܬܐ ܕܒܥܕܘܦܝܢ . ܦܪܫ ܐܝܟ ܡܫܘܚܬܐ ܡܢ ܡܬܘܦܠܛܐ ܠܡܝܛܘܟܘܢܕܪܝܐ . ܕܝܕܥ ܠܗ ܡܬܥܕܘܬܐ ܗܘܝܐ ܕܢܦܫܘܬܐ . ܘܝܠܝܕ ܐܚܕܬܐ ܒܡܥܒܕܢܘܬܐ ܕܐܘܟܣܕܝܢ ܠܟܪܝܘܬ ܐܘܟܣܝܕܐ ܕܒܕܚܘ ، ܘܡܢܐ ، ܘܡܦܩܢܘܬܐ ܕܬܘܩܦܐ ATP ܘܡܫܡܫܘܬܐ ܚܠܝܡܬܐ . ܘܒܕܝ ܗܟܢܐ ܪܘܬܐ ܗܘܝܐ ܕܢܦܫܘܬܐ ، ܠܗ ܗܘܡܢܐ ܕܝܠܢܝܐ ܒܡܝܛܘܟܘܢܕܪܝܐ . ܦܝܫܐ ܐܝܟܢܐ ܒܕܝܢܐ ܒܥܡܢܐ ܕܒܗܝ ܬܘܩܦܐ ܢܦܫܘܬܢܝܬܐ (Crestae) ، ܘܝܠܝܕ ܡܥܒܪܢܐ ܠܚܠܒܐ ܠܗܢܐ ܕܡܝܛܘܟܘܢܕܪܝܐ . ܘܗܟܢܐ ܐܝܟ ܡܫܘܚܬܐ ܕܪܡܘܬ ܕܐܝܘܡܐ ܕܥܠܬܐ ܢܦܫܘܬܢܝܬܐ ܘܡܬܢܦܫܢܝܬܐ ܐܢܫܐ ܠܡܦܩܢܘܬܐ ܕܐܚܝܕܬܐ . ܘܡܦܩܢܘܬܐ ܕܬܘܩܦܐ ATP . ܢܦܠܢ ܠܗ ܝܠܕܐ ܒܢܦܫܗ (ܒܗܝ ܬܘܩܦܐ) . ܐܝܢܐ ܐܝܟ ܐܝܘܡܐ ܕܝܘܕܥܬܐ ܕܥܕܡܝܗ ܠܗ ܡܠܟܐ (Matrix) ܕܡܝܛܘܟܘܢܕܪܝܐ .

ܘܟܠ ܕܐܝܬ ܬܘܩܦܐ ܗܘ ܕܦܠܝܛ ܠܗ ܡܝܛܘܟܘܢܕܪܝܐ ܡܟܘܦܫܢܐ ܒܡܢܬܘܢܝܬܐ ܕ ATP . ܦܪܫ ܡܢ ܡܝܛܘܟܘܢܕܪܝܐ ، ܘܦܠܝܛ ܠܗ ܦܝܫܬܐ ܒܬܘܕܥܬܐ . ܐܝܟܢܐ ܕܐܝܬ ܒܘܟܪܐ ܕܥܡܠܬܐ ܕܝܘܬܪܢܐ ܡܢ ܬܘܩܦܗ . ܘܟܠ ܕܐܝܬ ܦܬܐ ܡܕܝܬܐ ܡܝܛܘܟܘܢܕܪܝܐ (ܒܗܝ ܬܘܩܦܐ) . ܘܟܠ ܕܐܝܬ ܦܪܢܐ ܐܝܬܘܗܝ ܠܗ ܒܥܕܬܐ ܡܕܡܝ ܒܘܥܪܐ ܕܚܒܘܪܘܬܐ ܚܠܝܡܬܐ . ܐܝܟ ܒܥܕܬܐ ܒܝܢܬܐ ܠܗ ܢܒܢܬܐ . ܘܒܥܕܬܐ ܕܒܒܕܐ . ܘܒܥܕܬܐ ܠܓܢܬܐ ܘܐܒܘܒܥܝܐ ܗܒܝܢܐ ܘܥܕܒܗ ܠܗ ܢܫܡܬܐ . ܘܡܝܛܘܟܘܢܕܪܝܐ ܝܠܝܕ ܗܘܡܘܝܐ ܘܒܥܕܐ ܐܝܟ ܠܗ ܡܬܘܦܠܛܐ . ܕܚܘܝܢܗ ܝܠܗ ܒܝܢ ١ . ٢ ܡܝܟܪܘܡܝܛܪܐ . ܘܦܬܝܗ ܒܝܢ . ١ ܡܝܟܪܘܡܝܛܪܐ . ܘܡܠܝ ܐܣܟܡܐ ܡܫܚܠܦܐ ܐܝܟ ܐܣܦܪܘܝܐ . ܐܘ ܫܘܦܪܢܝܐ ܐܘ ܠܦܪܢܐ ܐܣܟܡܐ (٣ . ١٢) . ܘܦܝܫܐ ܐܝܟܢܐ ܡܕܝܢܐ ܒܚܕ ܝܠܕܐ ܘܦܠܓܐ ܒܕܢܐ ܘܠܘܢܐ . ܘܐܢܕܢܐ ܡܢܗ ܒܐܣܟܡܐ

ܕܓܘܦܐ ܩܠܦ̈ܢܝܬܐ ܠܓܘܗ ܓܘܦܐ ، ܚܕ ܐܝܟ ܕܒܠܝܫ ܒܓܢ̈ܒܐ ܒܪܡܘܟܠܝܐ ܓܠܝܫ ، ܚܕ ܡܢܗܘܢ ܐܚܪܢܐ ܩܠܦܢܐ . ܘܐܝܬܘܗܝ ܕܐܝܟ ܐܝܢܐ ܓܘܦܐ ܠܗ ܩܠܦܐ ܠܓܘ ، ܦܘܫܪܐ ܡܢ ܡܟܘܣܝܐ ܕܓܘܫܡܐ ܕܡܝܬܘܟܘܢܕܪܝܐ ܠܓܘ . ܘܐܢܐ ܡܦܠܓܐ ܒܟܘܠܠܐ ܕܡܕܘܪܘܬܐ ܢܦܝܫܘܬܢܝܬܐ .



ܨܘܪܬܐ (٣ ـ ١٢) ܡܝܬܘܟܘܢܕܪܝܐ

ܘܓܘܫܡܐ ܕܡܝܬܘܟܘܢܕܪܝܐ ܡܠܝܐ ܕܡܠܒܫܐ (Matrix) ، ܕܡܝܬܝܬ ܐܝܟ ܓܘܡܓܡܐ ܕܪܒܝܥ ܐܝܟ ܕܡܘܕܒܕܪ . ܘܡܚܒܪ ܒܪܘܡܒܐ ܕܩܠܦܐ ܕܡܝܬܘܟܘܢܕܪܝܐ ܡܠܝܐ ܦܪܘܛܝܢܐ . ܘܡܠܝܐ ܡܪܫܝܢܐ . ܘܦܪܝܫܐ ܗܢܐ ܒܡܘܬܒܗ ܡܪܝ ܢܦܘܕܘܬܐ ܠܘܬܢܝܬܐ .

١٣ ـ ܐܝܢܘܬܐ ܕܢܦܝܫܘܬܐ ܒܚ̈ܝܘܬܐ ܚܘܪ̈ܐ :

ܣܘܓܝܐܐ ܡܢ ܥܒܕܘܬܐ ܕܢܦܝܫܘܬܐ ܥܒܕܘܬܐ ܕܡܫܠܡܘܬܐ ܠܥܒܕܘܬܐ ܕܒܚ̈ܝܘܬܐ ܚܘܪ̈ܐ . ܘܒܢܘܡܐ ܦܪܫ ܠܗ ܘܡܘܕܐ ܢܪܘܫܐ ܒܠܗ ܗܪܢܘܗ ܐܦܫܝܪܐ ܕܒܪܒܗ ، ܒܪܢܐ ܐܝܟ ܦܠܓܐ ܡܢ ܥܒܕܘܬܐ ܕܢܦܝܫܘܬܐ ܡܢ ܡܝܬܘܟܘܢܕܪܝܐ ܠܦܠܛܝܪܬܐ ܢܪܘܡܝܬܐ ، ܕܡܬܢܘܬܦ ܠܗ ܥܒܕܘܬܐ ܕܒܚ̈ܝܘܬܐ ܚܘܪ̈ܐ . ܐܦ ܦܪܫ ܥܘܡܩܐ ܡܢ ܐܦܫܝܪܝܢ ܦܠܓܐ ܡܢ ܥܒܕܘܬܐ ܕܒܚ̈ܝܘܬܐ ܚܘܪ̈ܐ ܡܢ ܦܠܛܝܪܬܐ ܢܪܘܡܝܬܐ ܠܡܝܬܘܟܘܢܕܪܝܐ ܕܡܬܢܘܬܦ ܠܗ ܥܒܕܘܬܐ ܕܢܦܝܫܘܬܐ ܥܘܡܩܐ . ܘܚܪܢܐ ܚܕ ܥܘܡܩܐ ܡܢ.

ܒܥܒܕܬܐ ܐܚܪܝ ܕܦܫܛܐ ܒܣܝܐ ܠܗ ܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ، ܒܡܫܬܪܝܢܘܬܐ ܕܢܦܫܘܬܐ ܠܝܬܝ ܕܦܠܛܬܐ ܕܗܘܦܐ . ܐܘܟܝܬ ܗܘܦܐ ܕܝܠܗ ܡܬܒܝܕܗ ܐܦܝܗ ܥܡܛܐ ، ܗܘ ܕܦܥܠܗ ܡܫܘܦܬܐ ܠܗ ܕܘܟܬܐ ܥܒܕܬܐ ܒܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ، ܦܠܛ ܚܕ ܗܘܡܬܐ ܡܢܗ ܠܗ ܡܫܬܪܝܢܘܬܐ ܕܢܦܫܘܬܐ ܕܦܝܪ ܗܘܦܠܛܐ ܥܡܝܬܪܝܬܐ ܕܡܫܬܪܝܢܘܬܐ ܚܘܬܢܝܬܐ ܐܚܪܢܝܬܐ ܕܗܝܡܐ ܡܢܐ ܠܗܘܦܐ . ܘܗܕܟܐ ܗܪܘܚ ܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ܘܢܦܫܘܬܐ . ܡܗܡܠܝܢ ܠܝܠܐ ܕܐܘܟܣܓܝܢ ܠܗ ܗܘܐ ܐܐܪܐ . ܘܐܘܟܣܓܝܢ ܕܦܝܪ ܥܡܠܐ ܡܢ ܐܐܪ . ܠܗ ܡܫܬܪܝܢܘܬܐ ܢܦܫܘܬܢܝܬܐ . ܒܢܝ ܐܢܫܐ ܚܝ̈ܐ . ܦܝܪ ܡܗܘܝܠܐ ܒܐܘܟܣܓܝܢ ܦܠܛܐ ܡܢ ܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ܠܐܢܫܐ ܢܝܫܬܐ ܕܐܝܬ ܥܠ ܥܡܛܐ ܕܐܪܥܐ . ܐܦ ܦܝܪ ܡܗܘܝܠܐ ܗܕܢܝܬܐ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ . ܦܠܛܐ ܡܢ ܢܦܫܘܬܐ ܕܚܝܘܬܐ ܘܐܢܫܐ ܐܚܪܢܐ . ܠܗ ܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ، ܘܗܕܟܐ ܢܦܩ ܠܦܘܪܥܢܐ ܠܗ ܗܘܐ ܐܐܪܐ .

ܘܡܢܐ ܡܬܚܫܒ ܠܗ ܡܫܬܪܝܢܘܬܐ ܕܣܟܪ̈ܐ ܥܢܒܝ̈ܐ ܐܝܟ ܡܬܒܥܝܢܐ ܠܗܕܘܒܪ ܐܠܝܢܐ ܠܡܘܙܕܩܢܐ ܕܗܕܢܝܘܬܐ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ. ܠܡܝܐ ܕܟܪܒܘܗܝܕܪܬܐ . ܟܕ ܦܝܪ ܒܠܒܘܫ ܗܕܪܘܓܝܢ ܡܢ ܡܢܐ ܒܡܫܬܪܝܢܘܬܐ ܕܥܕܢܐ ܒܣܟܪܐ ܠܡܝܐ ، ܘܢܦܩܬܐ ܠܦܪܠܝܬܐ ܒܣܟܪܢܝܬܐ (ܐܝܟ ܕܡܬܝܕܥ ܡܢ ܡܕܒܪ) ، ܕܦܝܪ ܡܗܘܝܠܐ ܠܗ ܦܪܠܝܬܐ ܡܘܙܕܩܢܝܬܐ ܠܗܕܢܝܘܬ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ ، ܡܬܦܠܛܢܝܬܐ ܠܗܕܘܒܪܐ ܕܟܪܒܘܗܝܕܪܬܐ . ܟܕ ܗܘܝ ܒܚܕ ܐܗܐ ܗܕܪܘܓܝܢ ، ܘܦܝܪ ܒܠܒܘܫ ܡܢ ܕܘܟܬܐ ܗܕܪܝܐ (ܐܝܟ ܟܪܒܘܗܝܕܪܬܐ) ܠܗ ܕܦܪܬܐ ܕܟܪܒܘܢ . ܘܟܕ ܗܘܝ ܒܚܕ ܒܝܬ ܒܥܠܬܐ ܢܦܫܘܬܢܝܬܐ ، ܘܡܬܝܕܥܐ ܒܫܡܗ ܐܘܟܣܓܝܢ ، ܘܡܫܬܡܗ ܒܫܡܗ ܡܬܦܪܣܐ ܡܢܐ

١٤ - ܢܦܫܘܬܐ ܠܐ ܗܘܝܪܝܬܐ Anaerobic respiration :

ܡܢ ܚܕܡܢܐ ܐܝܬܝܗ ܕܡܝܫܐ ܕܡܫܝܢ ܠܗܘܦܐ ܐܢܫܐ ܠܡܬܥܒܕܢܘܬܐ ܕܠܒܘܕܘܬܐ ܚܘܬܢܝܬܐ ܡܢ ܐܢܫܐ ܕܡܠܘܐܐ ܗܕܢܝܐ ܒܟܪܝܘܬܐ ܕܐܘܟܣܓܝܢ . ܘܐܦ ܠܟܠܢܐ ܡܢ ܢܟܢܝܬܐ ܝܠܝܕܬܐ ܐܝܟܠܗܘܢ. ܡܢܗܝܬܐ ܠܡܢܝܘܬܐ ܒܢܦܫܘܬܐ ܠܡܓܕܫ ܐܙܝܢܐ . ܒܟܪܒܐ ܕܫܢ̈ܬܐ ܕܡܝܢܐ ܕܡܪܘܬܐ ܕܐܘܟܣܓܝܢ ܠܗ ܡܫܬܪܝܢܘܬܐ ܗܘ ܕܫܠܝ ܒܗ . ܡܟܠ ܕܐܘܐ

ܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ ܒܠܗ ܡܫܬܪܝܘܬܐ ܗܝ ܕܡܦܠܚܢܐ ܗܘܦܟܐ ܡܢ ܡܠܘܐܐ ܗܘܪܡܝܢܐ ܒܒܪܝܬܘܬܐ ܕܐܘܟܣܓܝܢ . ܗܘ ܦܪܝܫܬܐ ܒܠܗ ܒܓܒܪܬܐ . ܐܝܟ ܣܓ ܡܝܬܪܐ ܡܢ ܐܝܬܝܐ ܕܡܝܬܐ ܐܝܟ ܚܡܝܪܐ ܘܡܪܕܡܬܐ ܒܚܠܒܐ . ܘܗܘ ܒܠܗ ܐܪܥܐ ܠܗܘܪܐ ܡܢ ܢܫܝܡܘܬܐ ܕܡܝܬܝ ܒܗܘ ܐܝܟ ܐܝܬܝܐ . ܐܝܟ ܕܩܝܛܐ ܗܢܐ ܒܝܬܝܐ ܕܐܝܟ ܒܠܚܘܕ ܐܝܬܝܐ ܠܐ ܗܘܐܝܐ Anaerobes . ܘܐܝܬ ܢܫܝܡܘܬܐ ܒܠܥܕܝܐ ܒܓܪܬܐ ܕܒܪܝܬܘܬܐ ܕܐܘܟܣܓܝܢ ܠܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ ܠܡܫܡܫܘ ܦܪܝܫܐ ܒܦܪܢܣܬܐ ܕܚܝܘܬܐ . ܘܡܪܕܡܬܐ ܡܢ ܒܬܪ ܠܒܪܝܬܘܬܐ ܕܐܘܟܣܓܝܢ ܠܡܫܡܫܘ ܐܪܝܟܐ . ܘܡܪܕܡܬܐ ܐܚܪܝܐ ܠܐ ܡܫܟܚܐ ܐܠܐ ܠܡܫܡܫܘ ܒܪܢܫܐ ܪܒܐ ܒܕ ܡܦܩܝܢ ܦܠܚܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ . ܘܦܝܫܝܢ ܡܫܡܫܝܢ ܘܡܒܕܪܝܢ ܡܘܬܐ ܕܚܝܘܬܐ .

ܘܡܢ ܥܘܕܐ ܕܡܬܚܫܒܐ ܕܫܘܪܝܐ ܒܡܢܐ (ܡܬܪܢܝܬܐ ܠܡܪܕܝܬܐ ܕܗܘܐ) . ܥܒܕܐ ܕܦܠܚܐ ܡܫܡܫܐ ܠܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ ܐܝܟ ܝܬܝܪܐ . ܘܗܘ ܡܘܦܩܐ ܚܕ ܦܪܝܫܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ . ܒܠܗ ܡܫܟܚܬܐ ܠܡܘܠܕܐ ܠܐܢܪܓܝܐ ܒܡܬܚܫܒܢܘܬܐ ܕܚܝܬܐ . ܗܘ ܕܒܠܗ ܡܬܪܓܡܢܘܬܐ ܕܡܝܬܝܬܐ ܣܓܝܐܝܢ ܒܗܘܪܬܐ .

ܘܐܝܟ ܚܝܬܐ ܗܘܦܟܗ ܡܢ ܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ (ܡܫܟܚܬܐ) ܠܐܢܪܓܝܐ . ܘܦܠܓܐ ܥܠܝܗ ܐܘܟܣܓܢ ܕܢܫܡܐ . ܐܝܟ ܡܫܬܪܝܘܬܐ . ܘܐܦ ܠܐܝܬܘܬܐ ܕܐܘܟܣܓܝܢ ܒܗܘܦܟܐ ܕܐܝܬ ܢܫܝܡܐ ܗܢܐ ܡܢ ܡܫܬܠܚܬܐ ܕܡܫܬܪܝܘܬܐ ܕܢܫܝܡܘܬܐ ܗܘܐܝܬܐ . ܡܛܠ ܗܢܘܢܝܘܬܗ ܠܐܝܘܢܐ ܡܢ ܣܓܝܐ ܐܝܬܝܐ ܠܡܫܬܪܝܘܬܐ ܕܢܫܝܡܘܬܐ ܗܘܐܝܬܐ . ܘܗܟܢ ܡܪܕܡܬܐ ܐܪܥܐ ܒܡܫܬܐܪܐ ܒܐܝܬܘܬܐ ܕܚܘܠܐ ܘܐܘܟܣܓܝܢ ܕܡܦܠܚܝܢ ܒܚܘܠܐ ܐܝܟ ܗܘܪܡܘܢܐ ܕܡܘܕܝܢ ܒܗܘܦܟܐ ܘܡܬܚܫܒܝܢ ܠܗ ܠܚܡܘܨܐ ܕܐܟܣܝܕ . ܘܐܦ ܒܚܫܚܬܐ ܪܒܐ ܐܝܟ ܗܘܢܐ ܐܝܟ ܡܠܦܐ ܕܐܒܒܐ ܕܚܝܒܐ ܘܐܒܒܐ ܐܚܪܢܐ . ܘܡܫܬܠܚ ܢܫܡܬܐ (ܘܗܘ ܒܠܗ ܒܝܘܡܬܐ ܕܐܒܒܐ ܫܡܝܢܐ) ܠܥܠܐ . ܘܡܘܬܪܬܐ ܠܗ ܢܫܝܡܘܬܐ ܠܐ ܗܘܐܝܬܐ ܐܘ ܡܫܟܚܬܐ ܗܕܐ ܐܝܬܝܘܬܐ ܠܐܪܥܝܬܐ ܡܢ ܪܒܐ ܒܢܝܢܐ . ܘܡܦܠܚܬܐ ܕܚܘܠܐ ܘܗܘܪܡܝܢܐ ܘܡܬܢܝܢܐ ܘܐܚܪܢܐ . ܘܡܫܪܬܐ ܕܪܒܐ ܡܢ ܗܘܪܡܝܢܐ . ܘܡܦܠܚܬܐ ܕܚܘܠܐ ܘܡܪܕܝܬܐ ܡܢ ܦܝܫܬܐ ܕܚܘܪܬܐ .

ܚܠܝܗ ܐܝܬ ܝܠܗ ܦܠܚܐ ܕܡܫܚܠܦܘܬܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ܠܐܒܝܟܐ ܕܡܒܝܢܐ . ܘܐܝܟ ܡܘܕܥܐ ܗܘܝܐ ܒܚܘܕܐ ܡܢ ܥܒܕܐ ܕܒܘܡܝܐ ܚܘܫܒܢܐ ܘܡܨܛܒܝܢܐ ܡܢܗܝ ܐܠܗ ܟܦܕܐ ܘܐܠܗ ܡܢܐ ܠܡܫܚܠܦܘܬܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ، ܠܚܕܡܢܐ ܦܠܘܚܘܬܐ ܘܒܥܕܢܐ ، ܟܠ ܚܘܫܒܢܐ ܕܐܝܬ ܡܠܘܐܐ ، ܘܡܒܕܝ ܦܠܚܬܐ ܕܚܘܒܒܐ ܗܘܠܢܐ . ܐܝܟ ܡܦܕܢܝܬܐ ܢܫܝܡܘܬܢܝܐ ܒܐܘܗܐ ܐܘܕܝܐ . ܦܠܚܐ ܐܠܗ ܡܫܚܠܦܘܬܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ܚܕܐ ܟܡܝܘܬܐ ܡܢ ܐܘܡܦܐ ܒܝܬ ܒܐܘܪܕܬܐ ܡܢ ܗܝ ܟܡܝܘܬܐ ܡܢ ܓܒܕܐ . ܘܡܛܠ ܕܗܢܐ ܡܢ ܦܠܚܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ، ܠܐ ܐܝܬ ܡܐܘܡܨܝܐ ܒܐܘܪܕܬܐ ܒܚܝܕܬܐ ، ܘܐܝܟ ܢܛܝܕܐ ܒܚܕܐ ܟܡܝܘܬܐ ܡܢ ܐܘܡܦܐ ، ܐܝܟ ܕܡܚܘܘܐ ܐܠܗ ܐܗܐ ܐܘܡܠܬܐ :

ܢܫܝܡܘܬܐ ܗܘܝܐ

$C \quad 6 \quad H_{12}O_6 + 6O_2 \rightarrow 6C_2 + 6H_2O$ + ENERGY (673 KCAL

ܐܘܡܦܐ

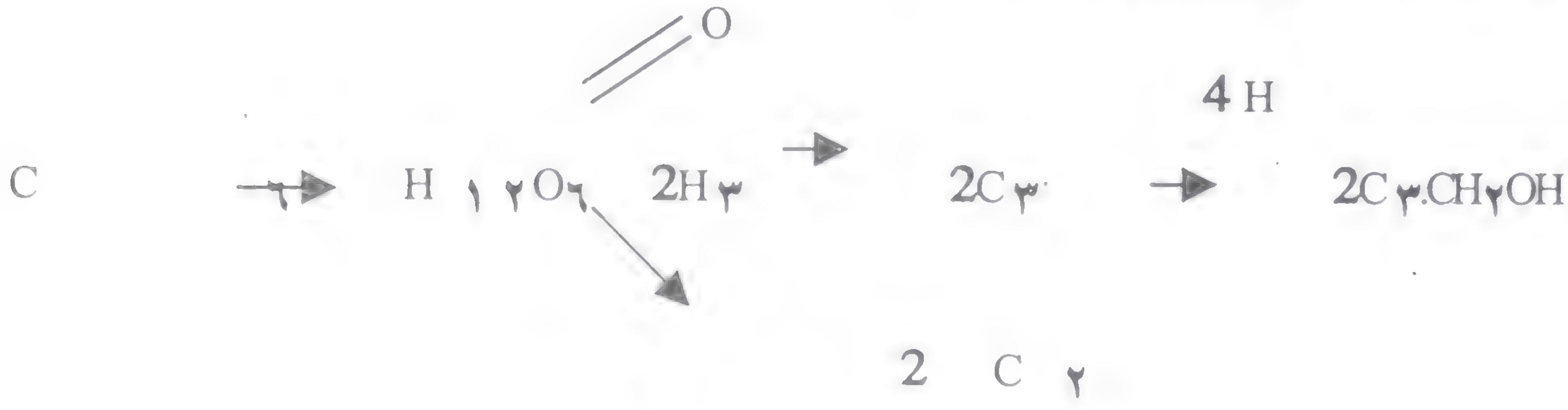
ܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ

$C \quad {}_6 \quad H_{12}O_6 \rightarrow 2C_2 + 2C_2H_5OH$ + ENERGY (26 KCAL)

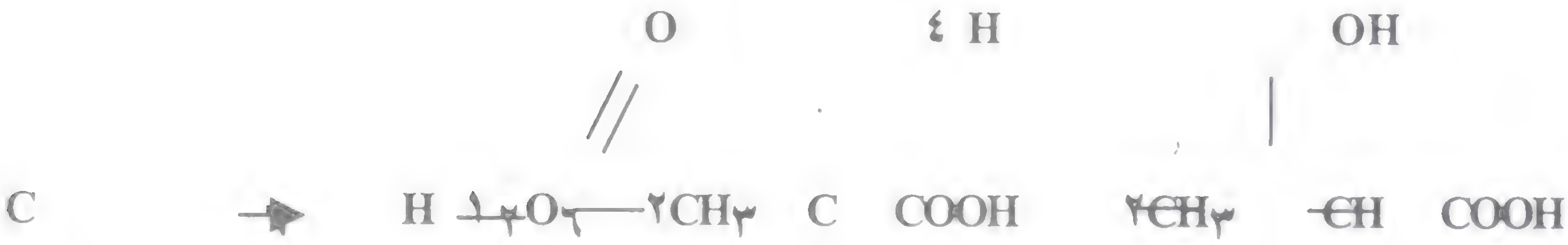
ܘܐܒܢ ܕܡܛܝ ܡܠܘܐܐ ܗܘܢܝܐ ܦܠܚܐ ܡܢ ܡܫܚܠܦܘܬܐ ܕܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ، ܠܚܕܐ ܡܢܝܘܬܐ ܡܐܢܫܡܬܐ ܦܝܫ ܕܟܐ ܒܗܘ ܐܘ ܡܫܢܝܐ ܐܒܝܐ ܐܝܟ ܕܡܢ ܡܦܕܠܗܘܢ . ܘܡܢܝܕܐ ܒܠܚܐ ܡܦܠܛܝ ܒܫܘܠܐ ܗܠ ܡܢܝܘܬܐ ܕ ١٢ - ١٦ ٪ ܡܢ ܕܡܥܒܕܐ ܕܒܢܬܗ . ܘܚܕ ܡܢ ܠܡܘܠܐ ܐܝܟ ܕܡܬܚܫܒ ܡܢ ܕܒܢܬܐ ܘܦܪܝܬܐ ܕܒܥܕܢܐ . ܒܠܗ ܡܦܩܬܐ ܕܡܠܘܐܐ ܗܡܫܢܝܐ ܦܠܚܐ ܡܢ ܢܫܝܡܘܬܗ ܠܐ ܗܘܝܐ .

ܘܦܠܓܘܬܐ ܚܘܫܒܢܝܬܐ ܠܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ . ܕܡܢܝܬܐ ܐܢܐ ܠܦܠܓܘܬܐ ܕܥܕܢܐ ܩܕܡܝܐ (GLYCOLYSIS) ، ܟܕ ܡܬܚܫܒ ܩܕܡܝܐ ܕܠܘܟܘܙ ܒܚܕܐ ܢܩܠܬܐ ܕܦܠܓܘܬܐ ܐܢܘܩܢܝܬܐ ܠܒܥܘܪܐ ܕܦܝܪܘܒܝܢ . ܐܝܢܐ ܢܫܝܡܘܬܐ ܠܐ ܗܘܝܐ ܡܗܝܡܢܐ ܚܕܐ ܦܠܚܬܐ ܒܝܬ ܐܚܝܢܬܐ ، ܟܕ

ܡܛܠ ܚܡܘܪܐ ܕܦܐܪܘܒܝܢ ܦܪܫ ܡܢܘܬܐ ܡܢ CO_2 ܘܡܬܚܠܦ ܠܐܣܝܛܠܕܗܝܕ ، ܘܗܘܐ ܦܝܫ ܡܣܘܪܦܐ ܠܟܘܗܠܐ ܐܬܝܠܝܐ ܐܝܟ ܕܒܣܡܝܪܐ ܘܦܘܪܫܢܝ̈ܬܐ ܐܚܪ̈ܢܝܬܐ .



ܐܘ ܡܣܘܪܦܐ ܕܚܡܘܪܐ ܕܦܐܪܘܒܝܢ ܠܚܡܘܪܐ ܕܚܠܒܐ (LACTIC ACID) ܟܕ ܐܝܬܝܗ ܦܪܝܫܐ ܐܚܪܝܐ ، ܐܝܟ ܕܗܘܝܐ ܠܗ ܒܥܘܪܐ ܠܡܬܚܪܫܢܝܬܐ ܠܐܝܓܪܐ ܚܝܘܬܢܝܐ ، ܘܠܗ ܚܕܡܢܐ ܐܕܝܐ ܕܒܚܝܕܐ ܐܝܟ ܕܦܝܫܐ ܥܠܝܗ ܡܫܝܚܐ ܠܗ ܕܗܘܐ ܡܘܠܕܐ :



١٠ ـ ܦܘܫܩܘܬܐ ܒܝܢ ܢܦܝܚܘܬܐ ܠܐ ܗܘܝܬܐ ܘܢܦܝܚܘܬܐ ܗܘܝܬܐ ܡܢ ܐܢܫܐ ܕܡܦܪܫܬܐ ܕܗܘܡܐ :

١ . ܠܗ ܫܘܚܠܦܘܬܐ ܕܢܦܝܚܘܬܐ ܠܐ ܗܘܝܬܐ ، ܚܕܐ ܡܦܩܬܐ ܡܢܬܢܝܬܐ ܠܗܘܡܐ ܕܐܝܬ ܠܗ ܠܠܦܘܚܘ . ܡܛܠ ܕܚܘܠܐ ܦܠܝܓܐ ܡܢ ܕܗܘܐ ܫܘܚܠܦܘܬܐ ܗܠܐ ܢܦܩܐ ܥܠܝܗ ܒܗܘܡܐ ܠܐ ܦܠܝܓܐ ، ܐܝܢܐ ܠܗ ܢܦܝܚܘܬܐ ܗܘܝܬܐ ܚܕܐ ܡܦܩܬܐ ܡܣܝܟܬܐ ܠܗܘܡܐ ܒܕ ܦܪܝܫܐ ܡܢܬܢܝܬܐ ܕܠܠܦܘܚܘ ܠܣܝܒܬܐ ܐܪܥܢܝܬܐ ، ܐܝܟ ܕܦܝܫܠܗ ܒܝܬܐ ܡܢܝܢ ܘܢܝܫܐ ܡܢܐ ܘܡܕܢܝܬܐ ܐܘܟܝܡܐ ܕܡܪܟܘ .

٢ - ܒܗ ܢܫܝܡܘܬܐ ܠܐ ܐܐܪܝܬܐ ، ܒܨܝܪܐ ܡܦܠܛܬܐ ܡܢܐܪܓܝܬܐ ܠܓܘܫܡܐ ܕܐܝܬ ܒܗ ܓܠܘܩܘܙ ، ܘܦܪܫ ܡܬܘܠܕܝܢ ܐܝܟ ܠܐ ܐܐܪܝܐ ܠܟܪܒܬܐ ܕܡܢܐܪܓܝܬܐ ܚܕ ܒܪܐ ، ܠܡܢܬܐ ܥܠ ܓܘܫܡܐ ܐܢܫܝܐ ، ܡܛܠ ܠܐ ܡܬܝܬܐ ܕܟܠܒܘܬܐ ܠܡܦܪܢܬܐ ܕܚܝܘܬܐ ܦܓܪܢܝܬܐ ܡܢ ܓܘܫܡܐ .

٣ - ܢܫܝܡܘܬܐ ܕܓܘܫܡܐ ܡܬܒܪܢܐ ܦܠܛܐ ܡܢ ܡܢܐܪܓܝܬܐ ܡܢ (ATP) ، ܘܗܘ ܝܬܝܪ ܚܕ ܡܠܝܠܐ ܒܪܐ ܡܢ ܢܫܝܡܘܬܐ ܐܐܪܝܬܐ ، ܕܦܪܫܐ ܡܬܡܢܝܢܬܐ ܟܝܘ ܒ ٣٨ ܡܢܐܪܓܝܬܐ ܕ (ATP) .

ܢܫܝܡܘܬܐ ܠܐ ܐܐܪܝܬܐ
ܓܠܘܩܘܙ
↓
ܚܡܘܨܐ ܕܦܝܪܘܒܝܢ
↓
ܬܪܝܢ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ
+
ܟܘܗܠܐ
+
2 (ATP)

ܢܫܝܡܘܬܐ ܐܐܪܝܬܐ
ܓܠܘܩܘܙ
↓
ܚܡܘܨܐ ܕܦܝܪܘܒܝܢ
↓ ← ܐܘܟܣܝܓܝܢ
ܬܪܝܢ ܐܘܟܣܝܕܐ ܕܟܪܒܘܢ
+
ܡܝܐ
+
38(ATP)

ܡܦܪܫܢܘܬܐ ܡܢܘܚܪܐ ܠܡܕܪܢܐ ܒܝܢ ܢܫܝܡܘܬܐ ܠܐ ܐܐܪܝܬܐ
ܘܢܫܝܡܘܬܐ ܐܐܪܝܬܐ

ܫܘ̈ܐܠܐ ܕܦܘܫܩܐ ܥܠܝ̈ܗ̇ (ܢܨܝܒܘܬܐ)

١ . ܠܡܢܐ ܟܕ̈ܝܢ ܠܘܬܡܐ ܚܢܢ ܒܥܕ̈ܢܐ ܕܡܘܬܒܗ ؟

٢ . ܡܢܘܢ ܐܢܝ ܝܘܡܬܐ ܒܗ ܐܢܫ̈ܝܬܐ ܕܗܘܦܟܐ ܦܠܚ̈ܐ ܡܢ ܦܠܚܘܬܐ ܘܠܫ̈ܢܬܐ ܠܗ ܐܝܟܢܐ ܚܢܢ .

٣ . ܡܢܝܢ ܠܐ̈ܢܫ ܡܢܘܬܐ ܒܗ ܐܢܫ̈ܐ ܕܗܘܦܟܐ ܐܢܫ̈ܝܢ ܠܚܘܬܐ .

٤ . ܦܣܩ ܒܝܢ ܗܕܐ ܡܚܪܘܬܐ ܕܢܨܝܒܘܬܐ ܘܡܢܘܢܝܬܐ .

٥ . ܡܦܝܣ ܠܐܘܪ̈ܚܬܐ ܕܦܫܝܛܐ ܘܕܒܝܪܬܐ ܕܗܘܪܕܬܐ ܘܢܛܪܝܢ ܠܗ ܗܘܝ̈ܠܦܐ ܗܘ̈ܦܟܐ .

٦ . ܡܢܘܢ ܠܡܚܪܘܬܐ ܕܗܘܝ̈ܠܦܐ ܗܘ̈ܦܟܐ ܠܗ ܐܢ̈ܫܐ .

٧ . ܢܡܘܣ ܒܚܕܢܘܬܐ ܗܘܡܐ ܕܢܨܝܒܘܬܐ ܠܗ ܡܠ ܡܢ :

ܐ . ܕܢܨܝܒܬܐ ܡܢ̈ܝܢܐ ܕܕܚܝܐ .

ܒ . ܠܗܘܢ .

ܓ . ܡܠܦ̈ܢܐ ܐܪ̈ܥܢܐ .

٨ . ܡܢܝ ܠܒܘܡܘܐ ܕܒܪܡ̈ܢܐ ܐܝܟ ܕܡܫܬܚܠܦܘܢ ܥܠ ܢܨܝܒܘܬܐ ܠܗ ܡܢܐ ܘܥܠ ܒܕܘܐ .

٩ . ܡܢܐ ܥܠܬܐ ܚܡܝܢܘܬܐ ܕܗܘܦܟܐ ܦܠܚ̈ܐ ܠܗ ܚܘܪܬܐ ܡܢ ܐܚܡܝܬܐ ܡܢܗܝܢܐ ܕܥܠܡܐ ܐܚܝܕܬܐ ܠܡܕܪܬܐ .

١٠ . ܡܢܝܢ ܠܡܫܡܠܝ ܢܨܝܒܘܬܢ ܐܝܟ ܕܢܗܘܐ ܠܗ ܡܢܗܘܦܢܝܬܐ .

١١ . ܦܣܩ ܒܝܢ ܢܨܝܒܘܬܐ ܗܘܝܬܐ ܘܠܐ ܗܘܝܬܐ ܡܢܘܢܝ ܠܚܡܝܢܘܬܐ ܕܗܘܦܟܐ ܦܠܚ̈ܐ ܡܢ ܗܕܡܝܗ .

١٢ . ܡܢܘܢ ܠܐܢܫܝܘܬܐ ܕܡܚܪܘܬܐ ܡܫܬܠܡܢܐ ܕܚܡܝܬܐ ܕܒܪܢܫܐ

١٣ . ܠܡܢܐ ܠܐ ܡܨܝ ܢܫܢܐ ܒܠܢܫܐ ܗܢܕܐ ܥܠ ܢܨܝܒܘܬܐ ܠܐ ܗܘܝܬܐ ܠܚܝܘ ܡܗܝܡܢܐ ܐܪܝܟܐ .

١٤ . ܡܢܐ ܥܠܬܐ ܐܢܫܝܘܬܐ ܕܚܝܝܐ ܗܘܝܐ ܠܗ ܓܢܪܐ ؟

١٥ . ܕܐܝܟ ܟܪܢܐ ܡܫܠܡܐ ܗܘܝܬܐ ܠܗ ܟܪܢܬܐ ؟

ܦܘܫܩܐ ܕܝܘܠܦܢܐ

ܟܘܦܐ

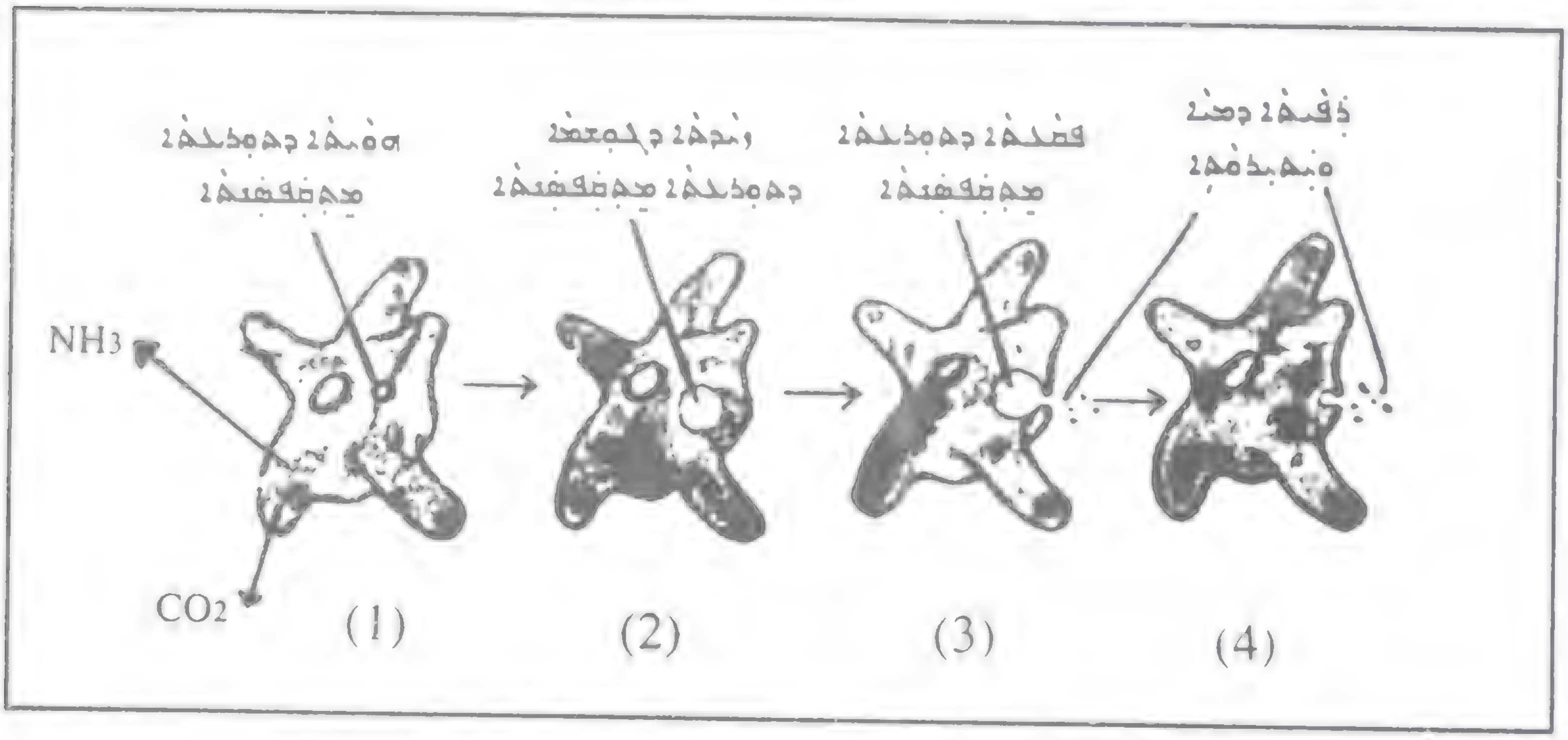
١ - ܡܫܝܚܬܐ ܠܚܘܕܗ.

ܗܟܢܐ ܕܟܘܦܐ ܐܝܬ ܒܗ ܦܪܝܫܘܬܐ ܕܡܬܒܪܝܢ ܡܢ ܢܣܒܐ ܘܡܫܝܚܐ ܕܦܓܪܐ. ܘܦܪܝܫܝܢ ܠܓܢܣܐ ܕܦܓܪܐ. ܘܡܬܒܪܝܢ ܒܐܘܪܚܐ ܕܠܐ ܦܪܝܫܝܢ ܐܝܬܝܢ ܦܠܓܐ ܗܘܝܐ ܚܕܐ ܡܢܝܢܐ ܚܒܪܐܝܬ. ܘܐܝܟ ܟܘܪܗܢܐ ܐܚܪܢܐ ܐܝܬܝܢ ܦܠܓܐ ܟܘܠܗܝܢ ܠܗܘܢ ܬܚܘܡܐ ܗܘܦܟܐ. ܐܝܟܢܐ ܕܐܝܬ ܒܠܚܘܕ ܡܢ ܦܠܓܐ ܕܒܢܝܐ ܠܬܚܘܡܐ ܒܢܝܢܐ ܠܐ ܕܡܬܚܫܚܢܐ. ܘܡܫܝܢܐ ܡܢܝܢܐ ܕܦܠܓܐ ܚܘܠܡܢܐ ܕܡܠܘܐ ܗܘܝܐ ܚܕܐ ܐܝܟ ܕܡܬܘܪܒܝܢ ܟܢܝܫ ܘܐܝܟ ܦܠܓܐ ܥܡ ܐܢܫܐ ܐܝܬܝܢ ܗܘܢܝܐ ܐܦܣܢܝܐ ܕܦܪܨܘܦܐ ܘܡܢܐ ܘܡܬܒܪܝܢ ܒܝܬ ܓܢܣܐ، ܐܝܟ ܕܡܬܚܙܝܢ ܐܘܪܚܐ ܘܡܬܦܪܫܢ ܕܒܝܬܝܐ ܘܗܝܢܐ ܘܡܬܦܪܫܢ ܦܪܨܘܦܐ، ܘܦܠܓܐ ܕܒܠܚܘܕ ܕܡܬܦܪܫܢ ܠܚܘܕܝܐ ܘܠܬܚܘܡܐ ܕܟܘܦܐ، ܐܝܟ ܕܦܪܝܫܐ ܡܦܘܪܫܬܐ، ܐܚܪܢܝܬܐ ܚܕܝܘܬܐ ܒܡܫܬܘܬܦܢܘܬܐ ܘܬܚܘܡܐ ܕܢܗܪܐ ܕܗܘܝܐ ܠܚܘܕܐ.

٢ - ܟܘܦܐ ܠܗ ܒܝܕܢܝܐ

ܒܕܢܐ ܗܕܐ ܬܚܘܡܐ ܕܦܪܝܫܐ ܕܡܬܒܪܝܢ ܠܗ ܒܝܕܢܝܐ ܟܘܪܗܢܐ ܠܚܘܕܝܐ ܒܐܘܪܚܐ ܕܡܬܚܙܝܐ ܕܒܘܕܩܐ ܠܚܘܕܝܐ (ܨܘܪܬܐ ٤ — ١) ܘܠܦܘܬ ܡܢܝܢܐ ܕܦܪܨܘܦܐ، ܒܝܕ ܟܠ ܐܝܟܢ ܕܐܝܬ ܡܬܚܙܝܐ ܕܡܬܒܪܝܢ ܡܬܚܘܫܐ ܠܗ ܗܘܦܟܐ ܡܢ ܡܢܐ ܕܐܝܬ ܠܗ ܡܢܐ ܕܐܝܬ ܡܠܘܐܐ ܕܟܘܦܐ، ܘܐܦ ܐܚܪܢܐ ܠܐ ܒܝܕ ܝܬܝܪܐ ܕܗܘܕܥܐ ܡܦܫܬܐ ܕܐܝܬ ܠܗ ܐܝܬ ܐܝܟܢܐ ܒܝܕܢܝܐ ܗܘ ܡܢܗ ܗܘܐ، ܒܝܕ ܦܬܓܡܐ ܡܪܝܬܐ ܒܥܠܬܐ ܕܡܘܡܝܐ ܡܢ ܡܠܘܐܐ ܡܕܘܦܐ ܡܢ ܐܝܬ ܬܚܘܡܐ ܕܗܘܕܥܐ ܡܦܫܬܐ ܒܡܬܚܙܝܢܘܬܐ ܕܐܝܬ ܠܡܣܬܟܠܘ ܕܡܬܚܙܝܐ (Micropipehe) ، ܘܦܬܓܡܐ ܒܝܕ ܗܕܐ ܕܡܬܦܪܫܢ ܒܟܠ ܐܝܬ ܡܢܝܢܐ، ܘܦܬܓܡܐ

ܚܘܝܬܐ ܕܡܥܝܢܘܬܐ ܕܐܡܘܒܝܢܐ ܠܗܘܢ، ܠܐ ܗܘܐ ܥܠܝܬܐ ܠܟܪܟܐ ܕܗܘܢܐ ܡܘܢܬܐ ܕܐܦܝܗ̇ ܒܡܝܘܟܠܘܬܐ ܕܗܘܪܟܬܐ ܥܠܝܗ̇، ܘܡܟܬܐ ܡܠܗ ܣܟܝܟܬܐ ܐܪܢܐ، ܕܝܟܬܐ ܕܗܘܪܟܬܐ ܡܦܫܩܬܐ ܒܠܗ ܢܗܪܬܐ ܕܗܘܠܟܬܐ ܕܚܡܝܘܬܐ ܕܡܢܐ ܠܗ ܐܝܟܢܐ ܚܢܐ ܘܟܪܝܗ، ܘܡܛܠ ܐܝܬܘܬܐ ܕܪܟܐ ܥܠܠܬܐ ܕܦܠܚ ܡܬܚܪܝܐ ܥܠ ܘܢܬܐ ܕܚܡܝܘܬܐ ܕܡܢܐ ܠܗ ܟܪܟܢܐ، ܡܢܗܘܢ:



ܨܘܪܬܐ (٤ ـ ١) ܡܚܘܝܢܐ ܡܫܚܠܦܐ ܠܡܬܥܠܢܘܬܐ ܕܚܝܘܬܐ ܡܢܐ
ܘܡܘܦܩܐ ܠܗ ܐܡܒܐ .

١ ـ ܟܪܟܬܐ ܕܚܪܐ ܚܡܝܘܬܐ ܠܓܘܪܬܐ ܡܢ ܡܢܐ ܡܢ ܠܗ ܚܝܠܬܐ ܚܘܪܬܐ ܠܗܘܢ ܡܢܘܬܐ ܕܢܘܦܪܐ .

٢ ـ ܡܢܐ ܦܠܛܐ ܡܢ ܗܘܟܪܬܐ ܕܐܡܒܬܐ .

٣ ـ ܡܢܐ ܟܪܝܟܐ ܥܡ ܗܘܪܟܢܐ .

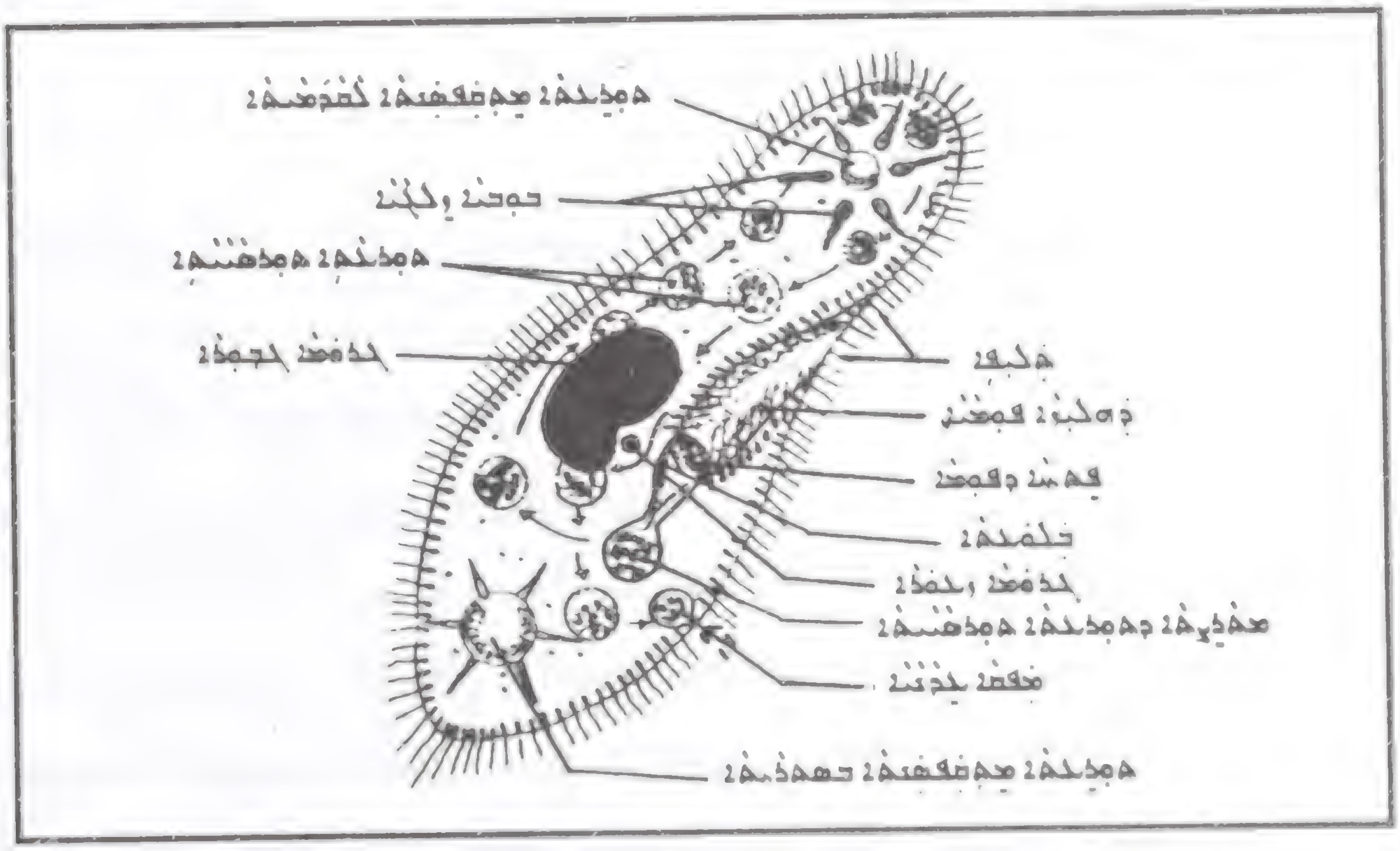
ܘܡܟܬܐ ܡܠܗ ܚܘܝܬܐ ܕܐܡܒܐ ܡܬܚܡܝܢܬܐ ܘܐܡܒܐ ܗ̇ܝ ܕܚܢܢܐ ܠܗ ܡܢܐ ܡܠܘܚܐ، ܗܦܝܟܐ ܡܢܐ ܡܢ ܗܘܪܟܬܐ ܡܦܫܩܬܐ، ܐܝܢܐ ܐܝܟ ܦܝܫܠܗ ܡܘܬܪܐ ܠܗ ܡܢܐ ܙܦܝܐ، ܟܪܟܢܐ ܠܗܘܢ ܗܘܪܟܬܐ ܡܦܫܩܬܐ. ܐܦ ܦܝܫܠܗ ܚܘܝܬܐ ܕܝܢ ܦܝܫ ܡܘܙܝܕܐ ܡܠܝܐ ܡܢ ܡܠܚܐ ܕܗܘܪܟܢܐ ܠܡܢܐ ܕܚܢܢܐ ܠܗܘܢ ܐܡܒܐ ܚܪܬܐ، ܗ̇ܝ ܡܫܠܡܢܐ ܠܗܘܪܟܬܗ ܡܦܫܩܬܐ، ܡܛܠ ܡܚܝܘܬܐ ܕܗܝܘܦܠܘܣ ܕܐܝܬ

ܠܗܘ ، ܘܠܐ ܢܫܟܚ ܡܪܐ ܡܢ ܠܗ ܠܣܘܓܐ ܚܘܪܬܢܝܐ ، ܘܚܘܕܪܐ ܠܗ ܗܘܢܐ ܗܝܡܢܘܬܐ ܠܡܬܚܪܝܬܐ ܕܐܦܐ ܗܘܪܒܬܐ .

ܐܝܬ ܠܗ ܦܪܡܝܣܝܘܡ ܐܝܟ ܗܠܝܢ ܐܪܒܥܐ ܡܢ ܫܘܬܦܘܬܐ ܝܬܝܪܐ :

ܐ . ܫܘܬܦܘܬܐ ܙܘܥܝܬܐ ܒܪܡܫܝܬܐ ܠܗ ܗܘܪܝܬܐ ܗܘܪܡܝܬܐ ܟܠܗ ܠܡܥܘܬܐ ܕܡܬܚܘܠܬܐ ܡܦܘܪܫܬܐ . ܘܟܪܣܐ ܦܘܡܐ ܡܢܗܘܢ ܒܡܥܠܢܘܬܐ ܕܡܦܩܐ ܠܒܪܝܐ ܢܦܠܐ ܟܪܣ ܦܘܡܐ ܕܒܠܘܥܬܐ (ܨܘܪܬܐ ٤ ـ ٢) .

ܒ . ܫܘܬܦܘܬܐ ܡܙܕܥܝܬܐ ܠܗ ܡܢܐ ܐܝܟ ܗܘܦܐ ܕܗܕܡܝܘܬ ܐܘܟܝܢܐ ܕܪܒܟܐ . ܘܐܬܘܡܝܬܐ ܘܡܙܕܥܢܐ ܡܠܝܚܐ ، ܘܠܒܪܝܬܐ ܐܝܟ ܗܪܟܐ ܗܘܪܝܬܐ ܡܦܩܢܝܬܐ ܒܦܘܪܫܘܬܐ ܕܡܬܒܠܥܘܬܐ ܠܒܣܪܐ . ܢܦܠܐ ܗܘܪܝܬܐ ܡܙܕܥܝܬܐ ܒܡܬܚܡܘܬܐ ܘܗܝ ܕܪܗܛܐ ܒܡܬܪܥܝܘܬܐ، ܘܦܠܚ ܣܘܟܠܝܬ. ܘܡܟܝܟ ܡܪܘܟܐ ܫܘܬܦܘܬܐ ܡܫܠܝܬܐ ܡܢܗܘܢ ܠܒܪܝܐ، ܘܫܘܚܠܦ ܡܚܘܪܘܬܐ ܕܪܦܝܬܐ ܕܫܘܬܦܘܬܐ ܠܗܘܦܐ ܕܡܬܠܠܗ ܒܪܝܬܐ ܡܢ ܐܪܝܬܘܗܝ ܗܠܝܢ ܦܘܫܩܐ ATP ܘܡܝܬܐ ܠܗ ܣܘܝܐ ܕܐܝܟ ܫܘܬܦܘܬܐ ܣܓܝܐܐ ܚܡܝܡܘܬܐ ܠܒܣܪܬܐ ܡܢ ܡܢܗ ، ܐܝܟ ܕܡܟܝܟ ܦܪܝܫܐ ܡܢܗܘܢ ܒܐܦܐ ܐܘܪܚܐ . ܘܚܘܕܪܐ ܡܢܐ ܒܪܬܐ ܕܢܦܩ ܢܦܩܗ ܡܢ ܢܦܫܘܬܐ ܒܡܢܐ ܘܡܚܠܬܐ ، ܘܠܐ ܢܦܩ ܠܡܬܝܘܬܐ ܡܬܚܫܬܐ ܠܡܘܥܝܐ ܕܦܪܡܝܣܝܘܡ .



ܨܘܪܬܐ (٤ ـ ٢) ܒܘܪܝܐ ܠܗ ܦܪܡܝܣܝܘܡ

٣. ܝܘܩܪܐ ܠܗ ܐܢܫܘܬܐ:

ܠܝܬ ܠܗ ܐܢܫܘܬܐ ܐܘܪܚܐ ܕܝܘܩܪܐ ܡܫܡܫܠܝܬܐ ܐܝܟ ܐܝܢܝ ܕܡܬܘܣܠܡܘܢ ܠܗ ܚܝܘܬܐ ܝܠܝܦܬܐ. ܘܦܪܝܫܐ ܡܢܐ ܐܢܫܘܬܐ ܐܚܪܬܐ ܡܢ ܚܝܘܬܐ ܒܡܢܝܢܘܬܐ ܕܝܘܩܪܐ، ܟܕ ܗܘܠܟ ܡܢܐ ܕܐܢܫܘܬܐ ܗܘܝܐ ܒܙܒܢܐ ܩܕܡܝܐ ܥܠ ܐܪܒܥܐ ܦܘܣܝܬܐ ܢܛܪ ܡܢ ܗܢܕܝܐ ܥܠ ܦܪܫܘܬܐ. ܩܠܝܠܐ ܒܩܠܝܠܐ ܠܗܘܠܟ ܡܢܐ ܕܐܪܒܥܐ ܦܘܣܝܬܐ ܒܕ ܡܠܝܠܐ ܫܡܫܘܬܐ ܡܢܐ ܐܚܪܬܐ ܡܢ ܢܛܪܘܬܐ ܝܬܝܪܘܬܐ ܩܠܝܠܐ ܡܢ ܗܘܠܟ ܡܢܐ ܕܦܪܫܘܬܐ، ܘܐܢܫܘܬܐ ܠܐ ܡܪܝܒ ܐܘ ܒܠܚܘܕ ܡܠܝܠ ܡܢ ܢܛܪܘܬܐ ܝܬܝܪܘܬܐ ܐܝܟ ܕܦܝܠܘܢ ܐܚܪܢܐ ܚܝܘܬܐ. ܐܝܟ ܡܕܪܐ ܘܡܫܘܚܬܐ ܕܢܦܫ ܘܐܡܘܢܐ. ܘܐܦ ܐܢܐ ܡܢ ܥܕܢܐ ܕܦܪܫܘܬܐ ܘܡܫܘܚܬܐ ܠܪܘܚܐ ܘܬܪܒܝܬܐ. ܘܩܢܝܐ ܡܘܟܐ ܕܡܘܪܕܟܢܐ ܕܗܠܝܢ ܠܗ ܐܢܫܘܬܐ ܐܚܪܬܐ ܒܕ ܡܠܝܠ ܡܢ ܡܘܪܕܝܐ ܠܗ ܚܝܘܬܐ. ܘܡܫܡܫܬܐ ܠܗܘ، ܐܢܫܘܬܐ ܡܬܪܒܝ. ܒܫܘܪܝܬܐ ܗܘܠܟ ܡܢܐ ܕܠܚܡܐ. ܪܘܟܒܐ ܝܬܝܪܘܬܐ ܡܕܡܝܐ ܠܐܝܟ ܡܬܘܪܝܐ ܠܗ ܚܝܘܬܐ، ܐܝܟܐ ܗܘܠܟ ܡܢ ܕܦܠܛ ܡܪܘܡܐ ܒܫܡܫܐ ܕܢܛܪܘܬܐ، ܦܬܐ ܗܝܬܐ ܡܦܠܣܬܗܝ ܠܚܝܘܬܐ ܕܡܠܟܐ ܐܪܒܥܐ، ܘܟܕ ܐܢܫܘܬܐ ܠܐ ܡܩܪܒ ܦܪܫܘܬܐ، ܘܠܝܬ ܠܗܘܢ ܟܕܢܘܬܐ ܒܡܬܪܒܝܢܘܬܐ (ܘܐܝܟ ܝܠܗ ܐܝܟ ܗܪܝ ܡܟܘܢܐ ܒܕ ܟܘܪܗܐ ܠܢܛܪܘܬܐ ܗܘܠܟ ܡܢܬܐ ܠܗ ܚܝܘܬܐ)؛ ܘܡܫܘܚܬܐ ܩܠܝܬܐ ܠܢܛܪܘܬܐ ܝܬܝܪܘܬܐ ܗܘܝܐ ܡܠܝܠܬܐ ܘܦܬܝܐ ܡܪܘܡܬܐ ܒܐܘܪܚܐ ܕܦܪܫܬܐ ܒܫܡܫܐ ܕܐܡܘܢܐ ܡܢ ܠܗ ܗܘܪܟܬܐ ܕܐܝܬ ܥܠ ܝܗܒܐ ܕܢܦܫܐ، ܐܘ ܒܫܡܫܐ ܕܡܠܝܐ ܕܐܚܪܢ ܝܬܝܪܝܢ ܡܕܦܠܘܢ، ܐܢܫܘܬܐ ܒܐܘܪܚܐ ܕܝܕܥܐ ܠܢܦܫܐ ܒܫܘܪܝܬܐ ܕܦܪܫܬܐ، ܥܠ ܕܐܝܬ ܠܐ ܐܚܪܝܢ ܐܢܫܘܬܐ ܠܐܘܪܚܐ ܕܝܘܩܪܐ ܡܫܡܫܠܝܬܐ ܐܝܟ ܕܠܗ ܐܝܬܝܘܬܐ ܠܗ ܚܝܘܬܐ.

ܐܝܢܐ ܒܫܘܬܦܘܬܐ ܠܟܠܐ ܘܗܘܝܐ ܕܡܪܝܘܬ ܐܘܫܝܢܐ ܕܪܒܘܢ، ܩܠܝܠܐ ܡܢ ܗܘܠܟܬܐ ܕܫܘܝܘܬܐ، ܐܢܫܘܬܐ ܢܛܪܘܬܐ ܡܦܠܣܠܡܘܢ ܠܗ ܗܘܠܟܬܐ ܕܒܢܝ ܢܫܐ ܒܕܪܐ ܕܝܘܡܢ. ܘܦܝܫ ܡܪܘܡܐ ܗܘܝܐ ܕܐܘܫܝܢ ܩܠܝܠܐ ܡܢ

ܗܟܘܬ݂ܐ ܕܟ̈ܠܢܐ ܒܛܘܪ̈ܐ ܘܡܕܝܢܝܘܬ݂ ܐܘܪܡܝܢܝܐ ܕܥܕܢܐ. ܦܠܝܛܐ ܡܢ ܢܒܝܥܘܬ݂ܐ ܒܡܪܗܛܐ ܒܐܘܪ̈ܚܐ ܕܬܘܪܟܝܐ ܘܦܠܣܛܝܢܐ. ܐܝܬ݂ ܡܢ̈ܐ ܓܘܢܣܐ ܕܓܘܠܫ ܦܫܛܐ ܡܢ ܦܘܪܣܝܐ ܒܐܘܪ̈ܚܐ ܕܬܘܪܟܝܐ ܒܡܕܢܚܝܬ݂ܐ ܕܐܪܥܐ. ܘܒܠܚܘܕ ܦܝܫ ܡܢ ܦܘܪܣܢܐ ܚܕ ܗܘܡܐ ܡܢܝܚ ܠܗ ܢܦܝܩܘܬ݂ܐ ܕܐܠܢ̈ܐ ܒܐܘܪ̈ܚܐ ܕܦܪܚܐ ܕܩܢܝܐ ܒܥܕܢܐ ܕܪ̈ܢܝܐ ܕܐܝܬ݂ ܠܗ ܓܪܘܦܐ. ܘܦܝܫܐ ܡܢܐ ܒܕܒܟܐ ܒܗܘܪܟܝܐ ܡܢ̈ܢܝܐ ܒܗܟܘܬ݂ܐ ܘܩܘܡܬ݂ܐ ܡܕܡܫܚܘܬ݂ܐ. ܐܝܬ݂ ܗܕ̈ܢܝܘܬ݂ ܐܘܪܡܝܢܝܐ ܕܥܕܢܐ. ܦܠܝܛܐ ܡܢ ܢܒܝܥܘܬ݂ܐ ܕܝܕܝܥܐ. ܦܝܫ ܡܢ ܦܘܪܣܢܐ ܒܐܘܪ̈ܚܐ ܕܝܕܝܥܐ ܠܟܠܦܐ ܒܦܪܗܛܐ.

ܐܦ ܦܪܫ ܢܝܫܐ ܡܢ ܡܠܘ̈ܚܐ ܗܡܡ̈ܢܐ ܒܐܘܪ̈ܚܐ ܕܡܬܦܪܫܝܢ ܡܢܝܚܐ ܦܪ̈ܝܫܐ ܒܐܣܛܘܟ݂ܐ ܕܥܕܢܐ ܠܐ ܡܬܦܪܫܢܐ. ܦܝܫ ܠܗ ܗܘܕܐ ܕܢܝܫܬ݂ܐ ܕܠܐ ܡܣܘܟܠܘ ܘܒܠܚܘܕ ܦܪܫ ܐܝܟ ܥܕܢܐ. ܦܪ̈ܝܫܝܢ ܒܠܘܚܐ ܕܡܠܚܐ ܕܠܫܢܐ ܠܗ ܓܪܘܦܐ. ܘܦܪܫ ܡܢܝܚ ܢܝܫܬ݂ܐ ܒܥܕܢܐ ܕܡܬܢܬ݂ܐ ܕܐܝܬ݂ ܓܪܘܦܐ. ܘܡܦܠܛܝܢ ܗܘܕܐ ܢܘܟܪܝܬ݂ܐ ܕܟܐ ܡܢ ܡܠܘ̈ܚܐ. ܐܝܟ ܕܡܦܪܫܝܢ ܒܐܣܛܘܟ݂ܐ ܕܦܠܛܐ ܗܘܠܟ ܣܢܝܐ ܠܐ ܡܬܦܠܝܐ. ܘܟܠ ܕܐܝܬ݂ܘܗܝ ܦܪܫ ܦܪ̈ܝܫܐ ܡܢ ܦܪܘܦܘܠܗ ܕܗܘܕܐ. ܐܘ ܡܢ ܠܘܚܡܐ ܢܘܟܪ̈ܝܐ ܡܠܗ. ܐܝܟ ܐܝܟܐ ܡܠܘ̈ܚܐ ܗܪܦܝܢܐ (Terpenes) ، ܘܐܝܟ ܕܫܚܡܐ (ܘܗܘ ܡܠܘ̈ܚܐ ܕܡܓܠܝܐ ܘܡܪܡܫܐ) ، ܘܡܠܘ̈ܚܐ ܝܡܢ̈ܝܐ ܘܡܠܘ̈ܚܐ ܕܓܠܝ̈ܢܐ ܘܚܠܒ̈ܐ ܢܘܟܪ̈ܝܐ ، ܟܕ ܐܝܬ ܐܝܟܐ ܡܠܘ̈ܚܐ ܠܗ ܗܘܕܐ ܐܘ ܩܡܕܐ ܒܦܩ̈ܝܐ ܕܐܠܢ̈ܐ ܒܠܚܘܕ ܡܘܗܘܢܝܬ݂ܐ ܗܒܕܘܢ̈ܝܐ (Glandular hairs) ܘܩܘܒ̈ܝܐ ܕܓܠܝ̈ܢܐ (Resinducts) ܘܩܘܒ̈ܝܐ ܕܡܫܚܐ (Oil ducts) ܘܩܘܒ̈ܝܐ ܚܠܒ̈ܢܝܐ (Latictiferous ducts) ܘܡܪܡܫܐ.

ܘܟܠܗ ܝܡܢܐ ܢܦܩܝܢ ܡܢ ܡܠܘ̈ܚܐ ܕܠܘܚܝܐ ܕܗܘܕܐ ܐܝܟ ܕܡܬܦܠܛܝܢ ܠܡܠܘ̈ܚܐ ܠܐ ܒܥܕܢܐ. ܬܡܠܟ ܢܫܡܬ݂ܐ ܕܝܡܢܐ. ܘܗܘ ܦܠܛܐ ܕܐܝܬ݂ܝܘܬ݂ܐ ܡܕܢܚܐ. ܐܝܟ ܕܒܠܘ ܒܐܠܢ̈ܐ ܕܢܫܡܬܝܐ. ܐܘ ܦܠܛܐ ܕܒܡܠܟܐ ܕܐܣܝܐ. ܐܘ ܣܘܪܟܐ ܡܢ ܡܕܒܪܢܘܬ݂ܐ ܡܣܬܒܪܢܝܬ݂ܐ ܐܘ ܥܠܘܒܐ ܦܣܘܠܘܓܝܐ.

ܐܝܟ ܚܠܒ̈ܐ ܢܨܒܬܢ̈ܝܐ ܕܗܘܐ ܕܪܣܡܢ̈ܐ ܕܡܠܘܐܐ ܚܠܒܢ̈ܝܐ. ܗܢܘܢ ܦܪܝܫܐ ܠܗ ܒܡܪܟܒܬܐ ܕܪܕܝܐ ܕܢܨܒܬܐ ܘܩܝܡ ܡܢܗܘܢ ܐܝܟ ܡܢܝܢ ܐܝܬ ܡܠܘܐܐ ܡܬܬܫܝܢ ܘܡܠܘܐܐ ܒܛܘܪ̈ܬܐ ܘܬܫܝܛܐ (Resins) ܘܩܘܡܐ ܦܪܘܫܐ. ܘܡܠܘܐܐ ܒܡܪܟܒܬܢ̈ܝܐ ܘܡܠܘܐܐ ܦܪܘܫܝܐ ܘܢܣܒܝܢ ܩܝܢܝܗ ܦܪܟܘܡܝ̈ܬܐ ܐܢܝܢܐ. ܠܘ ܢܫܡܬܐ ܘܗܢܝܐ ܘܡܠܘܐܐ ܒܣܒܠܐ. ܐܝܟ ܒܣܓܝ̈ܐ ܕܡܠܚܐ ܢܫܡܬܢܝܐ ܒܢܨܒܝܢ ܠܢܫܡܬܐ. ܠܐ ܡܠܘ ܦܝܫܬܐ ܒܝܕܥܬܐ ܠܡܦܪܫܗ. ܘܡܠܟܐ ܗܘܐ ܡܪܬ ܠܫܡܐ ܗܘܦܟܝܢ ܠܘ ܢܣܒܡܬܐ ܢܫܡܬܐ. ܠܘ ܗܘܢܐ ܢܣܒ ܡܠܘܐܐ ܡܩܝܡܐ ܠܘ ܢܫܝܢ ܐܢܫܝܢܐ، ܐܝܟ ܢܣܒܬܐ ܒܝܕ ܡܣܒܠܢܐ. ܒܠܘ ܕܡܠܚܐ ܢܫܡܬܢܝܐ ܠܐ ܡܠܘ ܠܐ ܢܣܒ ܦܠܛܐ ܕܢܫܡܬܐ ܠܦܫܠܘܢܐ ܗܘܡܠܝܢ. ܘܐܢܫ ܡܠܚܐ ܢܫܡܬܢܝܐ ܠܘ ܒܝܘܒܐ ܡܠܚܝܢܐ ܗܘܡܗ ܘܪܒܐ. ܘܡܛܐ ܢܘܓܕܐ ܠܗ ܢܪܘܦܗ ܠܟܪܝܐ ܒܣܠܐ ܒܟܪܝܐ ܕܒܪܬܐ ܕܡܛܪܬܐ: ܠܘ ܠܡܣܡܐ ܢܫܡܬܢܝܐ ܣܒܝܪܐ ܥܠ ܒܘܒܐ.

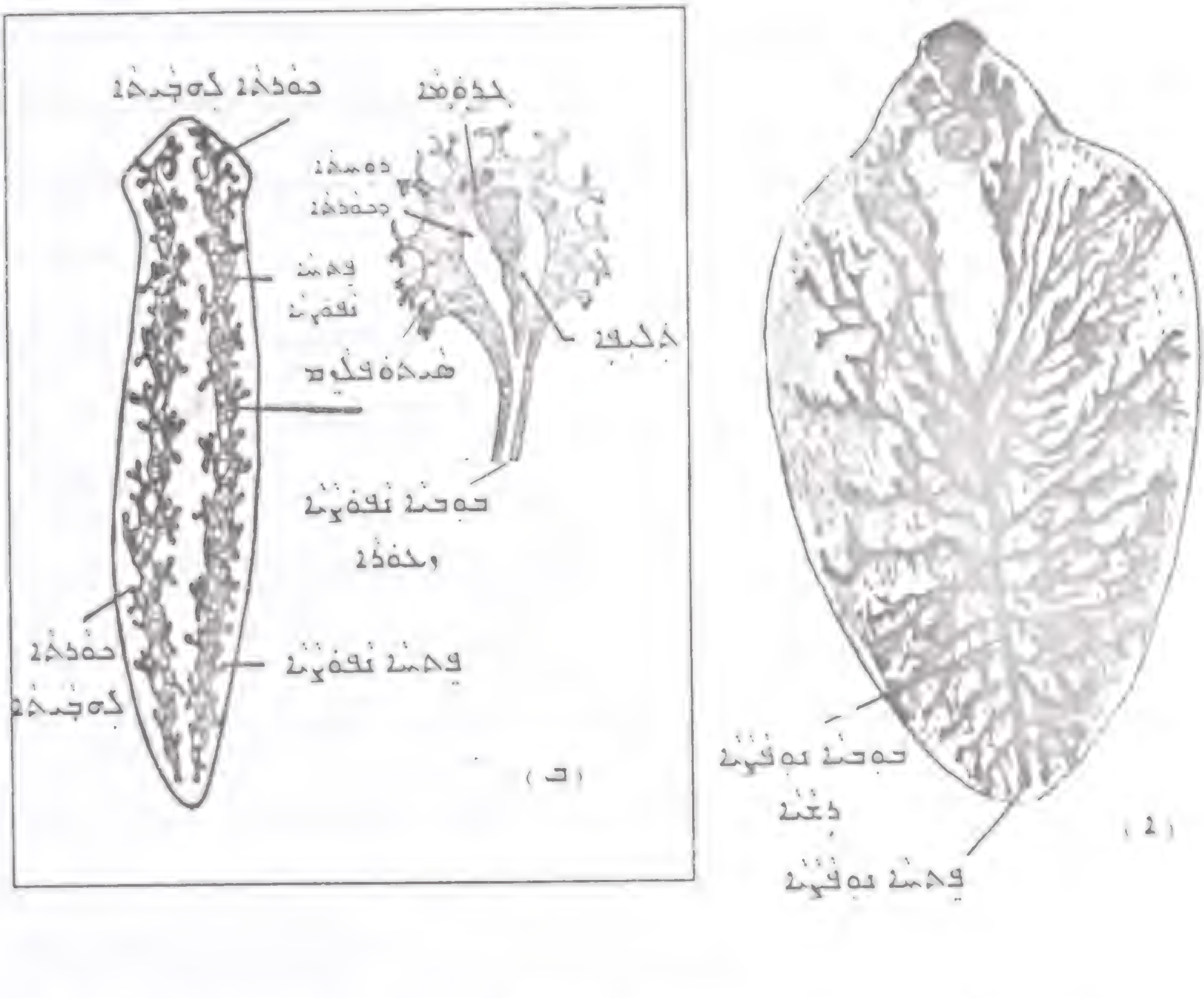
٤ . ܦܘܠܛܐ ܒܚܝܘܬܐ

٤ — ١ - ܦܘܠܛܐ ܒܗܘܠܟܐ ܡܫܝܛܐ:

ܡܢܡܢ ܐܡܪܝܢ ܕܦܘܠܛܐ ܠܗ ܗܘܠܟܐ ܡܫܝܛܐ ܡܢ ܠܘܬܐ ܕܗܘܡܟܐ ܐܝܬܐ ܘܝܒܫܐ. ܘܠܘ ܗܘܠܟܐ ܕܡܢܐ ܒܫܡܐ (ܦܠܢܪܝܐ Planaria) ܐܝܬ ܗܪܝ ܒܘܒܐ ܪܒܝܐ. ܗܘܝܢ ܡܢ ܣܪܛܐ ܕܠܘܬܐ ܠܡܘܬܐ. ܗܪܐ ܗܘܝ ܦܬܝܚ ܒܐܪܝ ܠܘܬܐ ܕܠܘܬܐ ܒܫܝܢܐ ܡܢ ܦܬܝܚܐ، ܘܡܛܠ ܕܗܢܐ ܦܬܝܚܐ ܡܢܝܢܐ ܡܢ ܒܘܒܐ ܒܝܬ ܢܝܪܐ ܒܣܝܡܐ ܡܢܝܢ، ܘܡܛܠ ܐܝܟ ܒܘܒܐ ܡܢ ܠܘܬܝܢ ܒܒܘܒܐ ܒܝܬ ܕܡܫܐ. ܡܠܝܢ ܒܡܘܪܬܐ ܦܬܝܚ ܡܪܝܐ ܒܘܪܬܐ ܠܘܒܝܐ (Flame cells)، ܣܒܝܒ ܥܠ ܗܘܢܐ ܡܢܗܪܘܢܝܬܐ ܐܝܬ ܒܗܘ ܗܠܟܐ ܘܡܢܗ ܒܐܘܪܚܐ ܡܪܘܡܝܬܐ ܠܘܡܐ ܕܠܘܒܐ ܕܡܘܪܐ (ܐܡܣܡܐ ٤ — ٣ ܒ). ܐܝܟ ܒܗܘܠܟܬܐ ܕܪܕܝܬܐ، ܐܝܬ ܒܗܝܢܐ ܕܫܢܐ ܡܢܘܬܐ. ܦܬܝܚ ܒܣܪܬܐ ܕܠܘܡܐ، ܘܦܪܪ ܒܡܪܡܘܬܐ ܠܪܒܝܐ ܒܘܒܐ. ܘܐܢܐ ܢܠܘܢ ܦܪܝܢ ܪܒܐ ܠܗܘ ܐܘ ܗܠ ܕܡܠܟܢ ܒܒܘܒܘܬܐ

ܡܬܘܪܒܝܢ ܩܫܝܐ ، ܡܛܠ ܕܗܘܦܐ ܠܘܒܠܐ ، ܘܡܫܬܡܫܘܬܐ ܕܡܘܥܕܐ ܕܐܠܦܐ ܕܗܘܦܐ ܠܘܒܠܐ ܦܝܫ ܣܘܪܩܐ ܥܡܠܐ ܣܓܝܐܐ ܥܠ ܡܬܒܪܘܬܐ ܝܬܪܘܬܐ ܠܚܘܚܘܬܐ ܘܚܘܒܝܐ ܒܝܬ ܠܚܘܪܐ ، ܘܡܬܪ ܗܪܟܐ ܠܚܪܝܐ ، ܒܗܘܪܢܐ ܕܩܡܝܢ ܢܘܦܩܐ .

ܘܦܠܣܝ ܐܦ ܗܘܦܐ ܠܦܪܘܣܬܐ ܕܠܘܥܣܐ ܡܢ ܚܒܘܫܝܐ ܡܬܒܪܘܬܐ ܡܬܥܒܪܬܐ . ܐܘ ܡܬܠܚܡ ܠܚܝܘܬܐ ܕܠܘܥܣܐ ܡܢ ܡܢܐ . ܘܡܟܝܠ ܐܠܐ ܣܓܝܐܬܐ ܕܝܬܝܪܐ ܕܠܘܥܣܐ ܐܝܬ ܠܗ ܡܢܝܢܐ ܠܦܪܘܣܐ ܡܢ ܡܬܒܪܘܬܐ ܝܬܪܘܬܐ ܒܗܘܪܢܐ ܕܦܪܘܣܐ . ܨܘܪܬܐ (٤ — ٣ ܐ) .

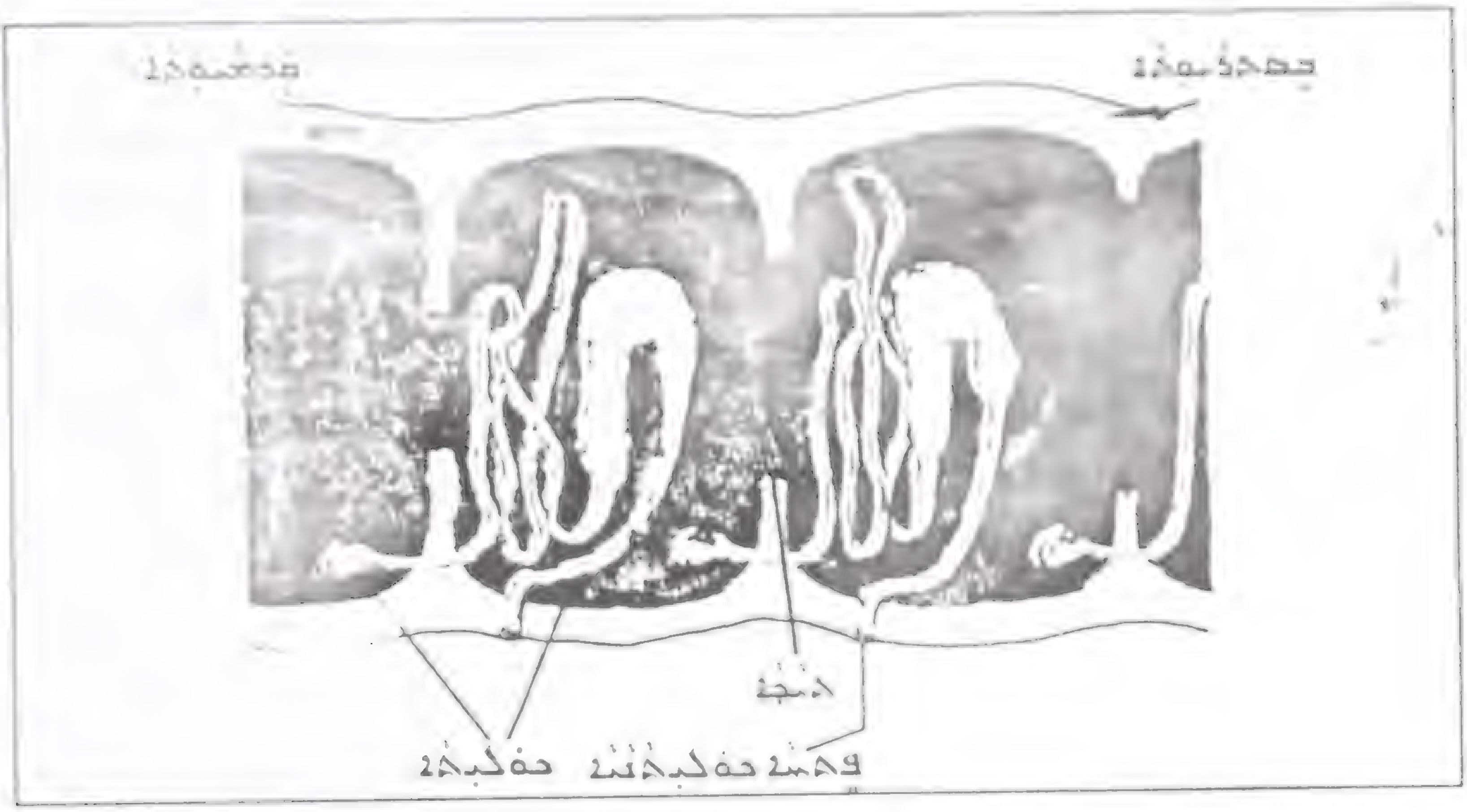


ܨܘܪܬܐ (٤ — ٣) ܐ . ܐܘܪܓܢܐ ܕܡܦܩܢܐ ܠܗ ܠܦܠܝܛܐ ܕܟܒܕܐ
ܒ . ܐܘܪܓܢܐ ܕܡܦܩܢܐ ܠܗ ܠܦܠܢܪܝܐ .

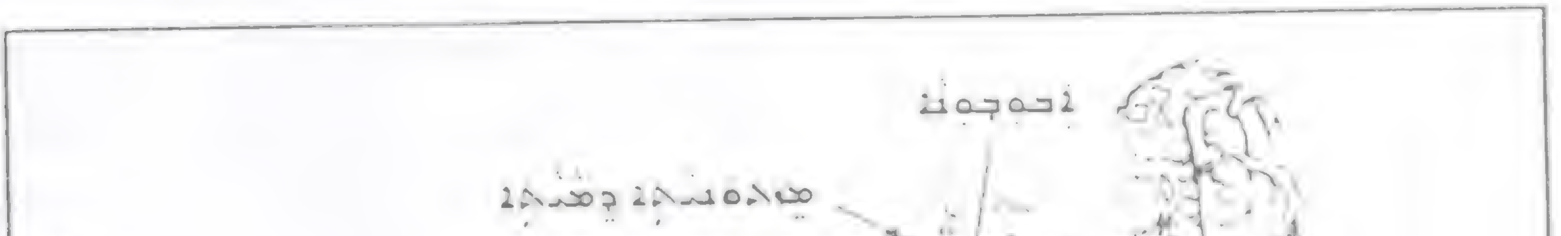
٤ — ٢ - ܡܦܩܢܐ ܓܘ ܬܘܠܥܐ ܚܠܡܢܝܐ :

ܡܦܩܢܐ ܒܝܗ ܐܝܬܝܗ ܕܡܦܩܢܐ ܓܘ ܬܘܠܥܬܐ ܐܪܥܢܝܬܐ ܡܢ ܦܝܫܐ ܕܘܓܐ ܡܢ ܦܘܠܚܢܐ (ܢܦܪܝܕܝܐ Nephridia) (ܕܚܙܝ ܠܨܘܪܬܐ ٤ — ٤ ܐ) ، ܢܦܠ ܟܠ ܚܕܐ ܚܠܡܬܐ ܡܢ ܚܠܡܢܝܐ ܕܓܘܫܡܐ ܚܕ ܙܘܓܐ ܦܝܫܝܗ ، ܒܐܝܕ ܓܘ ܚܠܡܢܝܐ ܗܠܗ ܦܘܫܝܗ ܘܚܠܡܬܐ ܐܚܪܝܬܐ . ܡܢܝܐ ܘܗܘ ܕܡܦܩܢܐ ܐܘܐ ܒܚܕ ܪܘܫܐ ܡܘܫܠܐ ܡܢܝܐ ܦܠܝܓܐ ܦܬܚܐ ܒܝܗ ܦܘܡܐ ܦܘܫܦܐ ܡܦܠܝܬܢܐ (ܢܦܪܘܣܬܘܡ Nephrostome) (ܨܘܪܬܐ ٤ - ٤ ܒ) ، ܢܦܠ ܡܢܗ ܗܢܐ ܦܪܘܟܐ ܒܝܢ ܒܪܝܗ ܚܠܡܢܝܐ ܢܦܩܬܐ ، ܘܚܠܠ ܕܡܢܟܠܐ ܠܢܦܝܫܐ ܠܓܘܠܥܬܐ ܡܢ ܠܒܬܐ ܒܪܫܝܬܐ . ܘܦܠܓܐ ܒܝܗ ܚܕ ܐܪܘܒܐ ܒܚܫܐ ܡܢܝܐ ܦܠܝܓܐ ، ܢܦܠ ܒܚܠܡܬܐ ܢܦܩܬܐ ، ܘܡܚܝܬ ܗܠܗ ܡܦܩܬܗ ܒܕܒܪܐ ܒܚܕ ܓܪܒܐ ܡܢ ܦܠܓܐ ܕܦܬܚܐ ܡܘܬܒܐ ، ܒܬܪ ܗܘܐ ܕܝܫ ܦܘܡܐ ܒܡܠܟܬܐ ܡܢܗ ، ܘܦܝܫ ܒܨܘܪܬܐ ܡܦܠܬܢܐ . ܘܦܝܫ ܐܘܐ ܦܘܡܐ ܒܓܢܒܐ ܒܪܫܝܬܐ ܠܓܘܠܥܬܐ ܒܚܕ ܦܘܡܐ ܦܬܚܐ ܒܝܗ ܡܢܐ ܒܦܘܡܐ ܡܦܠܝܬܢܐ (Nephridiopore) . ܦܝܫ ܡܘܚܒܪܐ ܚܕ ܦܘܡܐ ܡܢ ܥܒܠܐ ܕܦܘܫܬܐ ܠܓܘܫܡܐ ܓܘ ܡܘܫܠܐ ܒܚܠܡܬܐ ܕܘܓܐ ܕܦܠܝܓܐ ، ܘܟܠܢܐ ܡܕܡܟܪܬܐ ܕܦܬܚܐ ، ܘܚܒܪܘܬܐ ܡܠܦܢܐ ܡܦܬܚܬܐ ܡܙܡܪܐ ܠܦܘܫܗ ، ܐܝܟ ܟܡܦܐ ܕܝܢܒܐ (ܠܦܘܦܐ) ، ܒܡܬܚܡܬܐ ܕܦܘܪܬܐ ܕܓܘܪܐ ܕܐܪܘܒܐ ܒܐܘܪܚܐ ܕܡܢܘܬܐ ، ܘܦܝܫܗ ܠܦܬܚܐ ܡܘܬܒܐ ܕܦܬܚܐ ، ܒܕܒܪܐ ܚܕܐ ܐܪܘܒܐ . ܘܦܝܫ ܚܘܕܪܐ ܦܘܡܐ ܒܪܫܝܬܐ ܡܢ ܢܦܪܕܬܐ ، ܐܝܟ ܕܡܦܘܪܩܐ ܡܢܗ ܒܗܘܪܬܐ ܢܦܩܬܐ ܡܢ ܐܬܪܢܐ ܘܡܘܪܢܐ ܠܡܦܩܬܐ ܘܒܪܝܐ ܡܢ ܓܘ ܦܘܡܐ ܡܦܠܝܬܢܐ ܠܒܪ ܠܒܪ ܡܢ ܦܬܚܐ ، ܘܦܝܫ ܕܦܬܚܐ ܕܐܝܬ ܓܘ ܦܬܚܐ ܕܦܬܚܐ ܡܘܬܒܐ ، ܒܕܒܪܐ ܚܕܐ ܐܪܘܒܐ ܒܕܦܬܚܬܐ ܕܢܦܪܕܬܗ ܐܝܟ ܕܡܫܬܠܗܘܢ ܡܢ ܠܒܬܐ ܕܓܘܫܡܐ ܠܒܪ ܦܘܫܬܐ ܕܐܪܘܒܐ ܕܡܬܚܒܫ ܒܗ ܢܦܪܕܬܐ ܡܬܒܥܝܬܐ .

ܘܦܬܚܐ ܐܝܬ ܐܘܪܚܐ ܐܚܪܝܬܐ ܕܡܦܩܢܐ ܒܡܚܠܦܘܬܐ ܦܪܘܫܬܐ ܡܢ ܚܒܪܘܬܐ ܢܦܪܕܬܐ ܢܦܘܠܝܢܐ ܐܝܟ ܐܬܪܢܐ ܘܡܘܪܢܐ ، ܒܝܕ ܚܝܠܐ ܦܫܝܛܬܐ ܒܕܒܪܐ ܒܦܬܚܐ ، ܒܠ ܚܕܐ ܦܪܘܫܬܐ ܡܢ ܦܬܚܐ ܕܒܠܬܝܐ ܡܘܡܘܢܐ ܒܦܬܚܐ ܚܠܡܢܝܐ (Chloragogen Cells) ، ܦܕܒܪܐ ܡܢܐ ܒܦܘܬܚܗ ܕܘܒܪܐ ܕܓܘܫܡܐ ܗܒܪܬܢܐ ܡܫܘܚܐ ، ܠܡܘܒ ܐܝܬ ܒܦܬܚܐ ܡܢܐ ܕܡܫܬܠܗܘܢ ܦܬܚܐ ܕܦܬܚܐ ܕܒܪܐ ܡܢ ܢܦܪܕܬܐ ܒܝܢ ܓܘܪܐ ܘܐܚܪܢܐ ، ܘܦܪܥܝ ܡܢ ܚܝܠܐ ܦܫܝܛܬܐ ܒܦܬܚܗ ܓܘ ܥܒܠܐ ܕܦܘܫܬܐ ܠܓܘܫܡܐ ، ܘܡܥܒܪ ܒܝܗ ܓܘ ܡܘܫܠܐ ܕܡܦܠܝܬܐ (ܢܦܪܘܣܬܘܡ) ، ܐܘ ܒܡܫܬܠܗܘܢ ܦܬܚܐ ܐܚܪܢܐ ܦܪܘܫܬܐ ܓܘ ܥܒܠܐ ܦܘܫܬܢܐ ܠܓܘܠܥܬܐ ، ܘܦܝܠܗܘܢ ܕܨܘܪܬܐ ܙܘܓܐ ܒܬܚܘܬܐ . ܒܠ ܓܘܪܐ ܕܓܘܫܡܐ ܡܢ ܓܘ ܦܘܡܐ ܚܢܘܓܐ .



ܐܣܟܡܐ (٤ — ٤ ܐ) ܦܠܓܘܬܐ ܕܓܠܝܬܐ ܒܥܘܠܠܐ ܕܡܥܝܐ



ܐܣܟܡܐ (٤ - ٤ ب) ܐܣܟܡܐ ܡܘܪܟܒܐ ܠܥܘܠܠܬܐ (ܡܘܠܐ ܕܝܘܦܩܐ ܠܗ ܥܘܠܠܬܐ ܕܡܥܝܐ) .

٤ ـ ٣ ـ ܬܘܩܦܐ ܠܗ ܠܒ̈ܢܬܐ :

ܦܪ̈ܝܫܐ ܡܢܐ ܗܘܝܢܐ ܕܬܘܩܦܐ ܠܗ ܠܒ̈ܢܬܐ ܠܗܘܢ ܦܪܫܬܐ ܕܒܪܢܐ ܕܡܣܘܬܐ ܐܝܟ ܕܚܙܝܢܐ ܠܗܘ. ܗܘ ܡܫܘܕܥܐ ܕܢܝܫܐ ܡܢ ܡܫܘܕܥܐ ܕܟܠܗܝܢ ܕܡܣܘܬܐ ܘܠܐ̈ܪܥܐ ܟܕ ܬܡܠܝܣ ܗܕܐ ܐܪܥܐ ܦܪ̈ܝܫܐ. ܒܠܚܘܕ ܐܪ̈ܥܐ ܕܡܠܦ̈ܬܐ ܘܐܪ̈ܥܐ ܕܒܣ̈ܬܐ

٤ ـ ٣ ـ ٢ ـ ܬܘܩܦܐ ܠܗ ܦܣܛܐ :

ܐܝܟ ܐܪ̈ܥܐ ܕܡܠܦ̈ܬܐ ܚܝܘܬܐ ܡܬܚܠܦܐ. ܘܐܝܬ ܒܗ ܐܢܫܝܢ ܡܪ̈ܟܒܐ ܡܬܚܙ̈ܝܢܐ ܘܡܪ̈ܟܒܐ ܢܘܪ̈ܐ (ܐܝܟ ܠܗ ܠܗܘܢ) ܡܬܚܙ̈ܝܢܐ ܘܡܘܪ̈ܟܒܬܐ ܕܡܢܐ ܦܪ̈ܝܫܐ ܡܢܐ ܡܬܚܙܝܢܐ ܐܝܟ ܚܝܘܬܐ ܡܠܦ̈ܬܐ. ܡܛܠ ܡܠܦܝܢ ܒܪ̈ܐ ܓܘܐ ܠܗ. ܡܬܦܪܫܐ ܡܢ ܡܠܦ̈ܬܐ ܡܬܚܙܝܢܐ. ܕܒܝܠܗ ܦܪܐ ܕܝܠܗܘܢ ܘܡܬܦܠܓܐ ܚܕ̈ܝܐ ܡܢ ܡܕܡ̈ܝܬܐ ܕܡܠܦܘܢ. ܒܠܚܘܕ ܐܘ ܡܠܦܬܐ ܡܢ ܢܦ̈ܫܬܐ ܠܐܪ̈ܥܬܐ. ܕܡܚܡܐ ܠܚܝܘܬܐ ܒܪ̈ܝܬܐ. ܘܡܬܡܠܝܢ ܡܪ̈ܟܒܐ ܢܘܪ̈ܐ ܐܝܟ ܓܘܦܐ ܠܐܘܐ ܐܪ̈ܥܐ.

ܠܚܘܬܐ ܐܝܬ ܚܕ ܙܘܓܐ ܡܢ ܡܫܪ̈ܝܬܐ ܢܪܘܡܝܬܐ (Green Glands) ܬܦܩܢ ܡܢܐ ܒܢ̈ܝܬܐ ܒܪ̈ܫܐ ܕܪ̈ܥܐ ܘܠܥܘܡܩܐ ܕܚܘܛܐ. ܡܪܡܝ ܠܐܦܝܐ ܒܐܘܟܡܬܐ. ܘܡܠܝܢ ܥܠ ܦܪ̈ܬܐ ܕܓܘܫܡܐ ܡܢ ܢܫܪ̈ܝܬܐ ܡܪܓ̈ܫܢܝܬܐ.

ܡܬܦܪܫܐ ܗܠܝܢ ܫܪ̈ܝܬܐ ܡܢ ܗܠܝܢ ܬܘܡܐ ܕܪ̈ܝܫܐ ܒܠܚܘܕ:

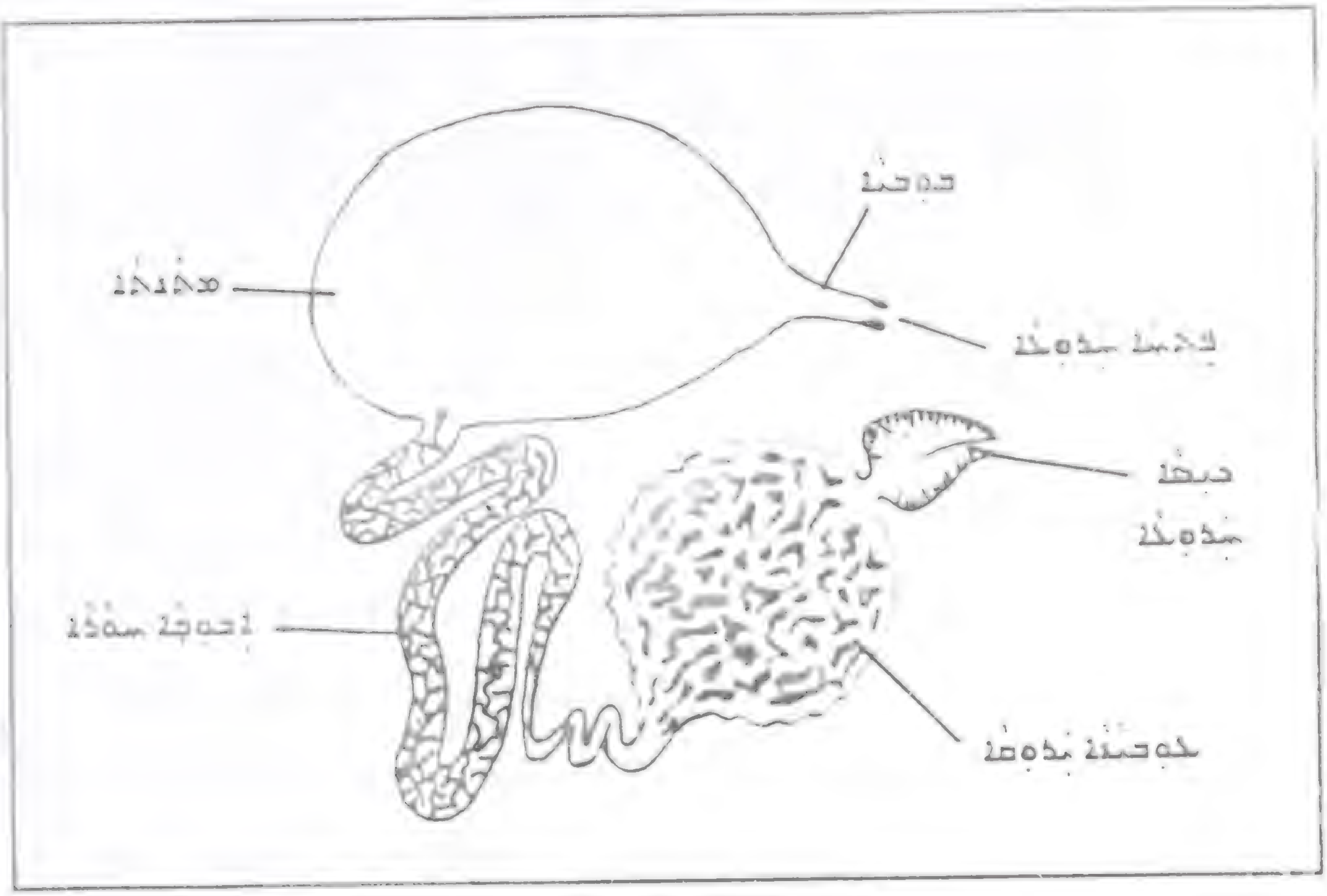
١ ـ ܒܪܫܐ ܘܒܬܪܐ ܚܕܘܕ ܓܘܢܐ. ܠܡܚܕ ܐܘܟܡܬܐ ܢܦܠ ܒܪ̈ܝܬܐ ܚܘܪ̈ܐ ܡܢ ܩܢ̈ܐ ܕܪ̈ܥܐ.

٢ ـ ܒܘܟܢܐ ܠܚܘܕܐ ܡܢܐ ܓܘܢܐ ܢܪܘܡܐ. ܐܝܟ ܥܠ ܚܕ ܠܒܕܐ ܗܒ̈ܢܬܐ. ܡܬܦܪܫܐ ܡܢ ܒܘܟܢܐ ܠܒܝܠܐ ܘܡܚܝܕܐ.

٣ ـ ܡܫܘܚܬܐ ܐܟܘܟܢܐ ܚܘܪ ܓܘܢܐ. ܠܡܢ ܐܘܟܡܬܘ ܓܘܢܐ. ܒܢܝ̈ܫܐ ܕܐܘܪܚܬܐ ܕܡܬܚܙܝܢ ܒܦܣܬܐ ܘܒܘܪ̈ܟܐ ܡܪ̈ܡܐ ܠܐܦܝܐ (ܐܘܟܡܬܐ ٤ — ٥).

ܘܦܪ̈ܝܫܐ ܗܠܝܢ ܡܬܦܫܬܐ ܗܠܝܢ ܗܒ̈ܢܬܐ (ܠܗ ܡܪ̈ܟܒܐ) ܒܚܕܐ ܢܪܘܡܬܐ ܡܢ ܘܡܘܕܐ ܡܪ̈ܡܐ ܗܒ̈ܢܬܐ. ܦܓܫ ܡܫܘܚܬܐ ܐܟܘܟܢܐ ܚܘܪܐ ܠܗ ܚܕ ܒܪܫܐ ܕܡܚܡܐ ܕܠܘܩܒܠ. ܒܢܝ̈ܫܐ ܡܬܚܙܝܐ ܗܒ̈ܢܬܐ. ܗܘ ܕܡܪ̈ܟܒܐ ܠܬܪ̈ܥܐ ܒܡܬܚܙܝܢܘܬܐ ܕܚܕ

ܐܡܥܐ ܕܩܛܝܢܐ ܡܫܘܚܠܦܐ ܕܐܟܠܐ ܘܡܥܒܪܢܐ ܠܗ ܠܠܘܚܐ ܕܐܟܘܠܐ ܠܡܫܘܚܬܐ ܕܝܡܐ . ܡܢܗ ܐܝܬ ܗܕܡܐ ܡܦܬܝܐ ܒܡܫܠܡܐ ܕܡܝܬܘܬܐ ܒܗܘ ܠܡܬܪܬܐ ܐܝܟ ܐܡܥܝܐ ܘܗܘܕܝܐ ܡܢ ܓܝܠܐ ܕܩܘܣܬܐ ܠܡܥܣܝܬܐ (ܕܡܐ ، ܕܪܝܡܐ ܕܟܠܗ ܕܠܡܥܣܐ ، ܘܕܡܠܘܬܐ ، ܠܚܕܐܠܐ . ܡܢ ܠܗ ܗܕܐ ܦܘܡܐ ܗܦܠܐ ܒܡܫܘܚܬܐ ܕܪܥܐ ، ܡܢ ܫܘܐ ܡܫܘܚܬܐ ܡܠܝܐ ܡܢ ܡܢܐ .



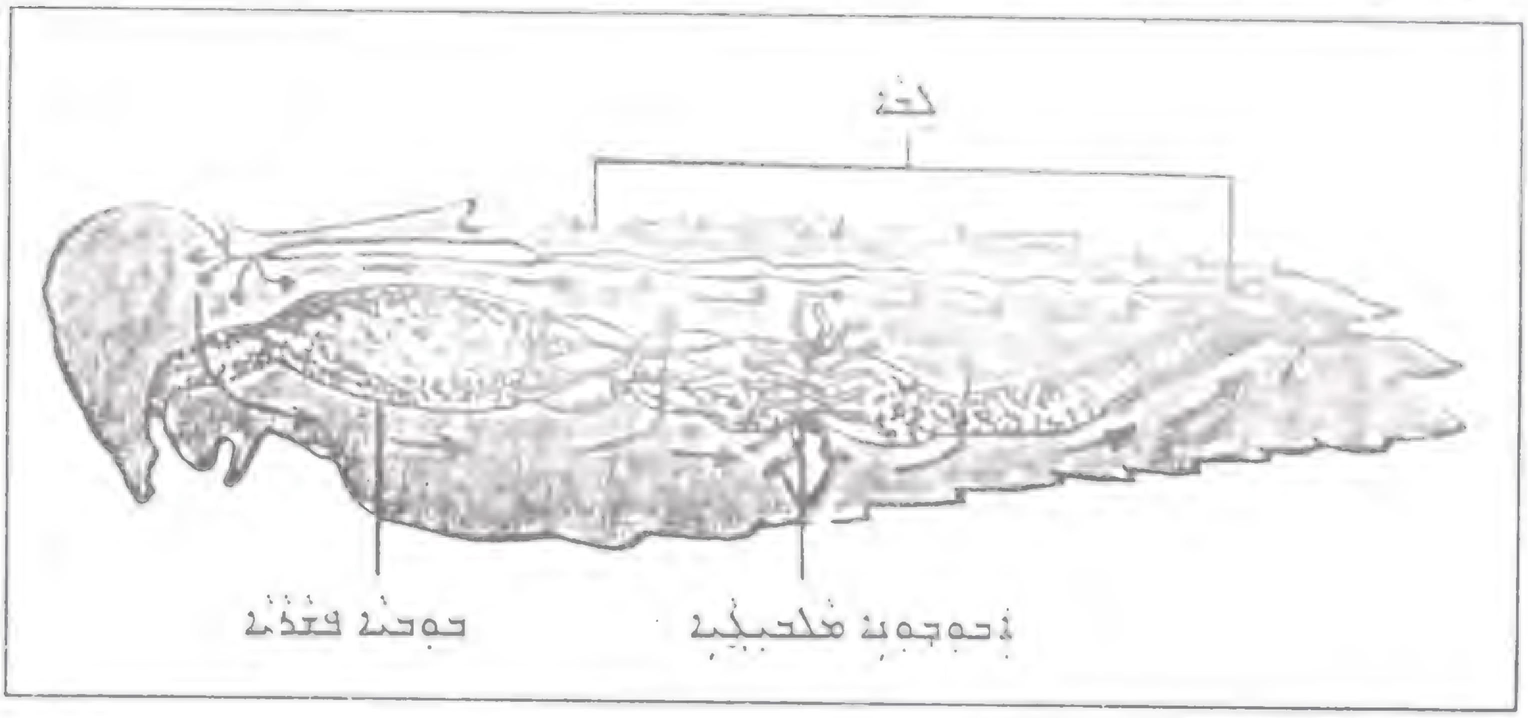
ܨܘܪܬܐ (٤ — ٥) ܡܛܥܢܐ ܕܗܘܢܝܐ (ܐܘܟܡܐ ܕܒܘܩܪܐ)

٤ — ٣ — ١ - ܗܘܦܩܐ ܠܗ ܡܠܦܢܐ :

ܡܫܘܕܥܐ ܠܗ ܐܘܪܚܐ ܕܗܘܦܩܐ ܠܗ ܕܡܝܐ ܒܡܘܫܚܬܐ ܕܝܡܐ ܡܢ ܟܘܠܝܬܐ ܕܪܐ ܡܢ ܐܡܥܐ ܡܠܟܝܟܐ ، ܘܒܠܝܗ ܐܡܥܐ ܠܕܪܐ ܘܡܛܐ ܕܡܛܐ ܡܢ ܟܠܕܐ ܕܐܝܟܐ ، ܘܡܛܝ ܠܗ ܓܝܠܐ ܕܩܘܣܬܐ ܠܡܥܣܝܬܐ ، ܘܡܚܝܐ ܡܢ ܟܠܕܐ ܠܫܒܥܐ ܒܡܘܪܐ ܕܐܡܥܐ ܕܥܕܐ ܕܡܫܘܪܐ (ܕܚܘܪ ܠܨܘܪܬܐ ٤ — ٦) . ܘܡܛܝ ܡܕܝܢܐ ܐܝܟ ܐܡܥܐ ܒܗܘܕܝܐ ܡܕܪܐ ܡܛܥܢܐ . ܦܠܚ ܠܡܫܘܚܬܐ ܕܡܛܥܢܘܬܐ

ܝܗܕܘܠܒܢܬܐ ܘܡܫܡܘܪܐ ܕܡܘܕܝܢ ܡܢ ܝܡܠܐ ܕܘܫܕܢܬܐ . ܘܦܫܛܝܢ ܡܘܡܣܚܝܢܐ
ܠܚܘܨܢܐ ܦܬܕܪܬܐ . ܟܕ ܦܬܝܐ ܡܘܟܪܝܟܬܐ ܗܝ ܟܡܫܘܬܐ ܒܝܕ ܚܒܘܫܬܐ . ܡܫܢܝܬܐ
ܡܢ ܩܢܐ . ܘܦܫܛܝܢ ܗܒܝܐ ܕܐܗܡܝܡ ܒܕܘܠܐ ܨܘܒܐ . ܡܘܕܟܐ ܕܗܘܝ ܗܟܝܡܐ ܡܢ ܩܢܐ
ܘܦܫܛܝܢ ܡܕܘܦܬܐ ܥܡ ܡܗܒܕܘܬܐ ܨܘܡܬܐ ܠܐܘܪܓܢܐ ܦܬܕܪܬܐ .

ܘܒܬܪ ܐܗܐ ܐܘܪܚܐ ܡܢܝ ܕܡܚܬܐ ܐܝܟ ܕܢܝܚ ܥܠ ܟܕܘܪܐ ܕܡܬܟܪܟ ܡܢ ܠܒܢܗ ܠܩܢܐ
ܐܝܟ ܕܦܫܛܝܢ ܕܬܐ ܗܝܡܢܐ ܐܠܝܗ . ܐܝܬܐ ܐܕܥܐ ܡܢܝܐ ܡܢ ܕܡܚܬܐ ܘܕܡܚܘܒܬܐ .
ܐܝܟ ܡܕܦܝܢ ܠܡܗܒܕܘܬܗ ܥܡ ܚܕܐ ܟܡܫܘܬܐ ܚܡܝܡܘܬܐ ܡܢ ܩܢܐ . ܡܝܬܠܐ ܚܝܘܗ
ܠܗ ܚܕ ܡܝܬܐ ܡܢܝܐ ܚܢܕܢܐ .



ܐܗܨܒܬܐ (٤ — ٦) ܢܘܦܩܐ ܠܗ ܕܚܝܐ

٥ . ܢܘܦܩܐ ܠܗ ܦܪܕܬܢܘܬܐ

٥ — ١ . ܐܘܪܓܢܐ ܕܢܘܦܩܐ ܠܗ ܦܪܕܬܢܘܬܐ :

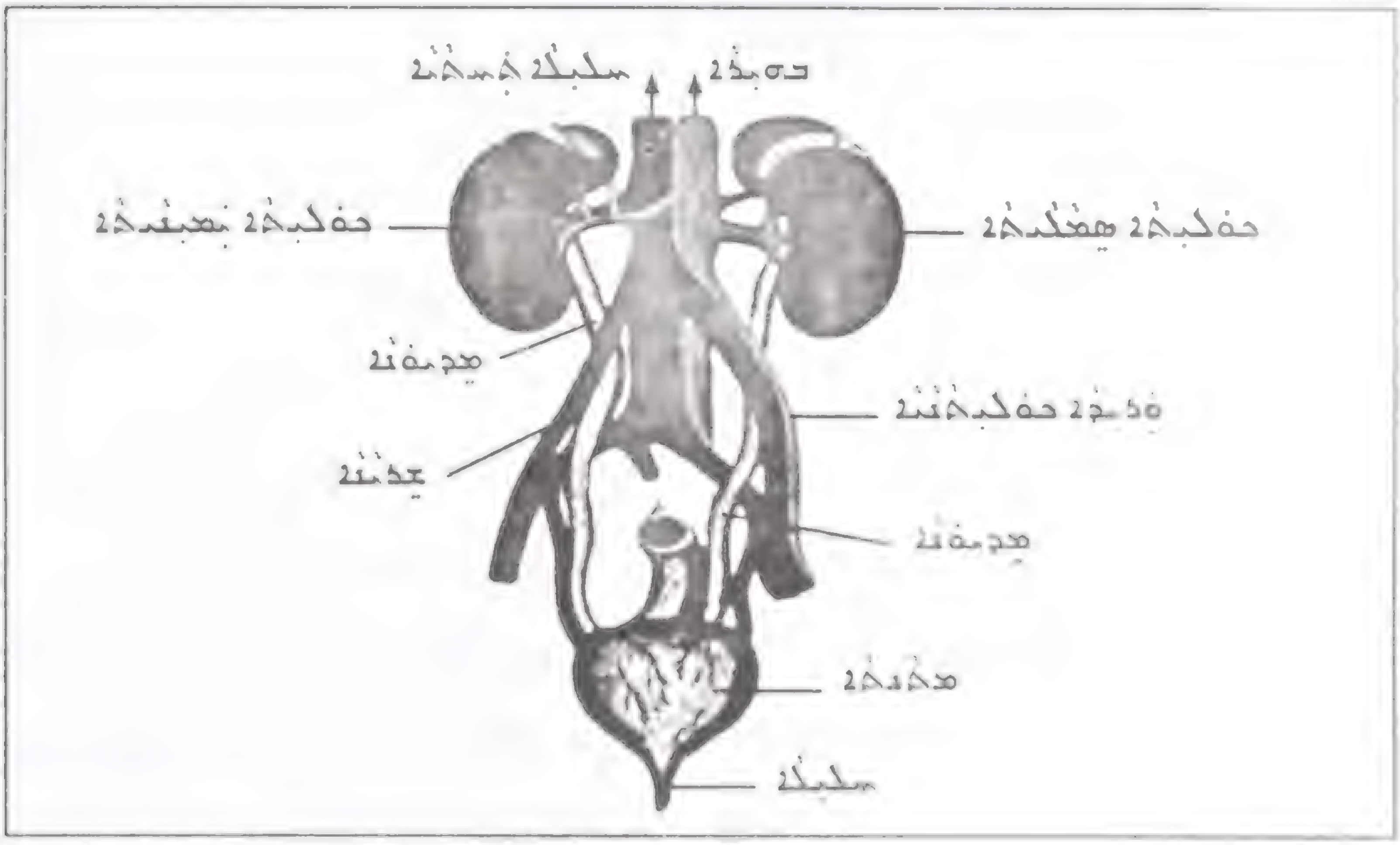
ܚܕܪܢܐ ܠܐܘܪܓܢܐ ܕܢܘܦܩܐ ܠܗ ܚܕܢܬܐ ܐܝܟ ܓܘܦܬܐ ܦܪܕܬܢܬܐ .
ܡܫܘܕܪܐ ܝܠܗ ܐܗܐ ܐܘܪܓܢܐ ܡܢ ܬܪ̈ܝ ܟܘܠܝ̈ܬܐ (Kidneys) ܘܬܪ̈ܝܢ ܩܢ̈ܘܢܐ (
Ureters) . ܘܟܠ ܚܕ ܡܢ ܩܢ̈ܘܢܐ ܦܘܠܚܢܐ ܕܦܪܕܝ ܟܘܠܝܬܐ ܥܠ ܚܕܠܬܐ ܕܚܘܢܝܐ
ܕܗܒܝܐ ܡܢ ܕܡܐ . ܘܐܠܐ ܦܠܚܝ ܐܦ ܥܠ ܢܦܪܕܬܐ ܕܗܘܡܠܐ ܕܡܢܝܐ ܘܡܘܕܪܢܬܐ .

ܘܡܟܢܫܝ ܬܪܝ ܡܙܡܘܢܐ ܗܝܕܐ ܠܡܬܢܬܐ ܗܝ ܕܡܦܩܐ ܠܗܘ ܠܒܪܝܬܐ ܕܦܓܪܗ ܒܪܕܝܐ ܕܒ ܚܒܪܐ ܒܫܒܝܠܐ.

٥ — ١ — ١ - ܬܪܬܝ ܟܘܠܝܬܐ :

ܐܝܬܠܗ ܬܪܝ ܗܕܡܐ ܕܡܫܢܐ ܒܦܬܪܬܐ ܕܦܓܘܪܐ. ܐܪܝܟܘܬܐ ܕܟܠ ܚܕܐ ܡܢܝܗ ܐܝܟ ١٠ ܣܡ ܘܦܬܝܘܬܗ ٥ ܣܡ ܘܥܒܝܘܬܗ ܐܝܟ ٢,٥ ܣܡ. ܢܦܠܝ ܬܪܬܝ ܟܘܠܝܬܐ ܥܠ ܓܘܪܐ ܒܣܬܪܐ ܠܥܠܝܘܬܐ ܕܪܡܬܐ ܥܠ ܬܪܝ ܓܢܒܐ ܕܚܨܘܪܐ ܦܩܪܬܢܐ (ܨܘܪܬܐ ٤ — ٧) ܘܡܬܚܙܝ ܐܠܗܐ ܒܣܬܪܢܝܬܐ ܠܬܪܬܝ ܟܘܠܝܬܐ ܡܢܬܢܝܬ ܦܬܚܝ ܡܣܘܓܐ ܬܪܬܝ ܟܘܠܝܬܐ ܒܕܘܒܫܐ ܒܘܫܘܪܐ ܠܒܪ ܒܪܬܢܝܐ ܡܬܪܒܝܢܐ، ܘܫܘܪܐ ܡܫܚܝܐ.

ܪܘܫܡܐ ܕܟܘܠܝܬܐ : ܡܬܚܙܝܐ ܐܝܟ ܟܘܠܝܬܐ ܡܢ ܦܠܓ ܡܢܘܢܐ ܒܓܘܪܐ ܡܢ ܪܘܫܡܐ ܡܪܘܪܒܢܐ ܒܓܒܐ ܒܟܘܠܝܬܘܬܐ (ܨܘܪܬܐ ٤ — ٨) ܐܘ ܦܪܘܬܐ، ܘܐܝܟ ܐܝܬܠܗ ܚܕ ܡܘܬܐ ܠܟܘܠܝܬܐ. ܡܬܚܙܝܐ ܐܝܟ ܟܘܠܝܬܘܬܐ ܡܢ ܡܢܘܬܐ ܕܒܐܬܪܐ ܗܢܐ :



ܨܘܪܬܐ (٤ — ٧) ܐܘܪܓܢܐ ܕܫܘܦܝܐ ܓܘ ܒܪܢܫܐ



. ܟܠܘܒܝܬܐ ܕܒܘܡܢ (Bowman Capsule) :

ܝܠܗ̇ ܡܕܡܝܐ ܕܫܘܪܝܐ ܕܐܒܘܒܐ ܘܗܘܐ ܡܪܘܟܒܐ ܒܟܦܬܐ ܒܓܘܝܐ ܝܠܗ̇ ܟܣܝܐ ܠܥܒܪܐ ܡܢ ܫܬܠܘܢܝܬܐ ܕܦܠܓܐ ܙܥܘܪܐ ܒܟܘܒܟܘܒܝܬܐ (Glomerulus) . ܐܝܬ ܠܗ̇ ܬܪܬܐ ܬܪܥܐ . ܡܬܐܘܪܐ ܝܠܗ ܡܢ ܬܪܥܐ ܩܕܡܝܐ ܡܢ ܟܘܪܬܐ ܣܠܝܩܬܐ ܠܗܝܬܐ ܘܦܠܛܐ ܠܥܒܪܐ ܠܟܘܒܟܘܒܝܬܐ ܘܡܢܟܝܬܐ ܝܠܗ̇ ܒܬܪܥܐ ܕܬܪܝܢ ܫܠܝܚܬܐ . ܐܝܬ ܬܪܥܐ ܐܚܪܝܢܐ ܝܠܗ̇ ܠܦܠܛܐ . ܘܡܢܟܝܬܐ ܡܢ ܟܠܘܒܝܬܐ ܕܒܘܡܢ ܘܟܘܒܟܘܒܝܬܐ ܟܕ ܚܕܪܐ ܟܬܪܡܘܣܝܬܐ ܒܠܒܢܝܬܐ . ܐܘ ܠܡܪܘܣܝܬܐ ܕܡܠܦܝܓܝ Malpighian Corpuscle .

٢ . ܐܒܘܒܐ ܦܬܠܐ ܩܪܝܒܐ (Proximal Convolated Tubule) :

ܘܝܠܗ ܦܘܫܐ ܐܚܪܢܐ ܡܢ ܐܒܘܒܐ ܒܠܒܢܝܐ . ܗܘ ܕܦܬܠܐ ܓܘ ܟܠܘܒܝܬܐ ܕܒܘܡܢ . ܘܝܠܗ ܐܒܘܒܐ ܡܬܐܘܪܐ ܡܢ ܟܘܪܬܐ ܡܘܦܩܢܝܬܐ . ܐܝܟܢܘ ܒܘܡܢܐ ܕܡܘܡܝܬܐ . ܡܟܢܝܢ ܬܚܘܬ ܡܬܐܘܪܢܝܬܐ ܟܘܪܬܐ ܒܐܦܘܚܝܬܐ ܕܡܬܪܐ ܦܬܠܢܐ ܒܬܡܘܬܠ ܕܚܠܝܠܘܬܐ ܕܐܒܘܒܐ . ܡܟܝܢ ܗܘ ܐܒܘܒܐ ܦܬܠܢܐ ܬܒܐ . ܠܐ ܡܬܪܐ ܐܪܒܐ ܡܟܣܝܐ .

٣ . ܚܪܒܘܫܬܐ ܕܗܢܠܝ (Henl'e Loop) :

ܡܕܡܝܐ ܐܘܐ ܦܘܫܐ ܠܐܬܘܬܐ ܢܘܢܐ ܕܢܚܬܐ ( ) . ܘܡܢܟܝܬܐ ܝܠܗ ܦܘܫܘ ܬܪܝܨܐ ܡܥܠܬܐ ܕܐܒܘܒܐ ܦܬܠܐ ܩܪܝܒܐ ܒܪܕܝܬܐ ܢܘܚܬܐ . ܘܦܘܫܘ ܬܪܝܨܐ ܐܐ ܚܕܬܐ ܒܪܕܝܬܐ ܦܠܘܚܐ . ܒܬܪܝܬܐ ܕܦܢܝܐ ܝܠܗ ܢܡܝܬܐ ܦܘܫܐ ܒܦܩܐ ܡܥܠܬܐ ܒܝܢ ܬܪܬܝ ܪܕܝܬܐ ܕܚܪܒܘܫܬܐ ܒܡܫܝܐ ܐܢܫܝܬܐ .

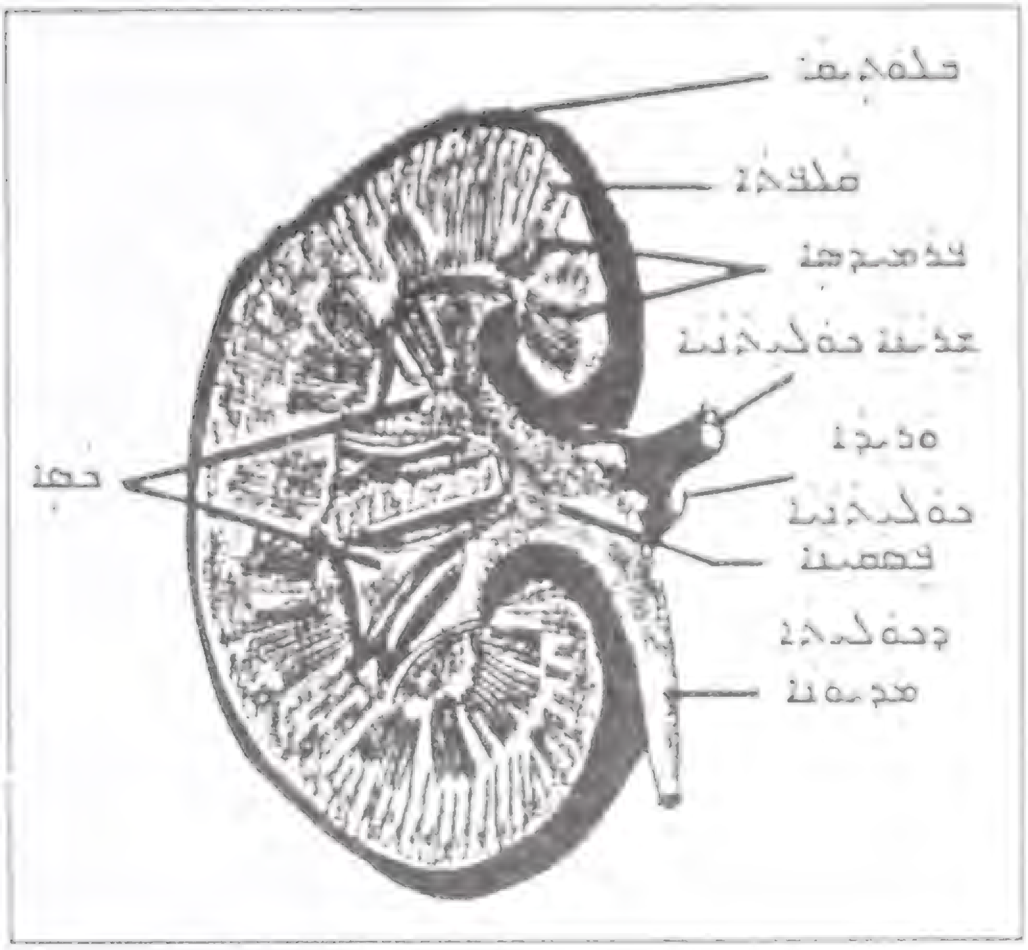
ܡܬܐܘܪܐ ܝܠܗ ܠܗܝܬܐ ܕܬܪܝܢ ܪܕܝܬܐ ܢܘܚܬܐ ܘܦܠܘܚܐ ܡܢ ܟܘܪܬܐ ܡܘܦܩܢܝܬܐ ܒܬܪܬܐ ܕܡܬܐܘܪܐ ܝܠܗ ܠܗܝܬܐ ܕܡܢܝܐ ܐܢܫܝܬܐ ܡܢ ܟܘܪܬܐ ܣܠܝܩܬܐ ܟܠܝܐ ܦܝܫܐ ܚܠܝܡܬܐ ܡܢܝܐ ܐܢܫܝܬܐ ܠܗ ܚܪܒܘܫܬܐ ܚܪܒܘܫܬܐ . ܘܒܝܢ ܬܪܬܐ ܟܝܢܐ ܠܪܕܝܬܐ ܦܠܘܚܐ ܗܘ ܝܠܗ ܕܦܢܝܐ ܕܡܬܪܐ ܦܬܠܐ ܕܚܪܒܘܫܬܐ

٤ - ܐܒܘܒ̈ܐ ܦܬܝ̈ܠܐ ܪ̈ܚܝܩܐ (Distal Convoluted Tubule) :

ܡܛܝ̈ܐ ܕܪ̈ܟܐ ܫܠܘܡܐ ܠܣܪܘܒܘܬܐ ܕܗܢܠܝ ܒܬܪ ܐܒܘܒ̈ܐ ܦܬܝ̈ܠܐ ܩܪ̈ܝܒܐ ܠܐܒܘܒ̈ܐ ܦܬܝ̈ܠܐ ܩܪ̈ܝܒܐ . ܐܝܟܢܐ ܗܘ ܒܝܢ ܒܪ̈ܢܐ ܠܗ ܡܢܗ ܘܒܝܢ ܚܘܪܐ ܒܡܬܚܐ . ܘܡܘܪܟܗ ܠܝܬܠܗ . ܡܢܐ ܦܪ̈ܫܘܬܐ . ܪ̈ܚܝܩ ܐܒܘܒ̈ܐ ܦܬܝ̈ܠܐ ܪ̈ܚܝܩܐ ܡܢ ܒܠܘܬܐ ܕܒܘܡܢ . ܘܟܠܢ ܠܗ ܚܕ ܐܒܘܒ̈ܐ ܡܩܦܢܐ ܕܡܩܦܢ ܠܬܝܢܐ ܡܢ ܪ̈ܒܐ ܐܒܘܒ̈ܐ ܒܘܠܝܬܐ . ܒܟܪ̈ܝܐ ܕܟܪ̈ܝܬܐ ܕܡܩܝܦܢܐ ܐ̈ܪܝܟܬܐ ܠܒܘܠܝܬܐ ، ܐܚܙܝ : - ٩ ، ܨܘܪܬܐ ܕܒܘܠܝܬܐ ܦܪ̈ܝܫܐ ܠܗ ܠܩܠܦܐ ܦܠܓܐ . ܟܕ ܗܝ ܦܪ̈ܘܫܬܐ ܒܗܘܢ ܒܩܠܦܬܐ (Cortex) ، ܘܠܗ ܒܓܘܐ ܒܠܒܐ (Medulla) . ܘܐܗܐ ܦܪ̈ܘܫܘܬܐ ܕܟܠܬܐ ܟܕ ܐܝܬ ܠܓܘܪܐ ܕܡܓܒܘܬܐ ܕܐܒܘܒ̈ܐ ܕܒܘܠܝܬܐ . ܟܕ ܚܙܝܐ ܩܠܦܬܐ ܠܡܩܦܢܐ ܕܡܠܟܝܢ ܘܐܒܘܒ̈ܐ ܦܬܝ̈ܠܐ ܩܪ̈ܝܒܐ ܘܪ̈ܚܝܩܐ . ܒܟܪ̈ܝܐ ܕܗܢܠܝ ܗܘܝܐ ܟܢܝܫܐ ܡܢ ܐܒܘܒ̈ܐ ܟܢܝܫܐ ܐܝܟ ܣܪܘܒܘܬܐ ܕܗܢܠܝ ܘܐܒܘܒ̈ܐ ܡܩܦܢܐ ܠܗ ܠܟܠ . ܟܠ ܕܐܗܐ ܟܡܠ ܚܘܪܐ ܠܠܒܐ . ܕܩܦܝ ܐܒܘܒ̈ܐ ܡܩܦܢܐ ܠܗ ܘܡܟܢܫܐ ܢܘܪܢܐ ܦܬܝ̈ܐ ܢܢܐ ܒܕܝܢܐ ܒܦܪܡܘܬܐ ܒܘܠܝܬܐ ܐܘ ܦܪܡܘܬܐ ܕܡܠܟܝܢ . ܐܝܟ ܕܡܬܚܡܝܢ ܕܗܘ ܡܚܡܝܢ ܡܬܢܐ ܠܠܒܝܢ ܒܪܐ ܐܘ ܠܟܠܝܬܐ ܠܩܠܦܐ ܘܟܪܘ ܐܘ ܚܠܡܬܐ . ܡܬܢܐ ܠܠܒܝܢ ܠܗܘܢ . ܦܬܚܝ ܒܘܢܐ ܡܩܦܢܐ ܠܗ ܚܠܡܬܐ ܕܦܪܡܘܬܐ .

ܟܒܪ ܠܒܘܠܝܬܐ ܡܢ ܠܒܪܗ ܠܗܘܢ ܡܡܠܪܐ . ܒܪ̈ܝܐ ܒܘܠܝܬܐ . ܐܦ ܟܡܠܗ ܘܪܒܐ ܒܘܠܝܬܐ ܘܡܢܝܢܐ . ܘܡܕܝܢܬܐ ܝܠܗ ܐܗܐ ܕܘܟܬܐ ܒܢܘܗܪܐ ܕܘܚ ܡܬܝܘܢܐ ܠܗ ܒܘܠܝܬܐ ܘܩܝܢ ܒܓܘܐ ܒܩܘܡܝܢܐ ܕܒܘܠܝܬܐ (Pelvis) . ܗܘ ܕܡܦܪܕ ܒܬܪܘ ܠܒܘܡܐ . ܒܪ̈ܝ ܒܪ̈ܐ ܕܦܪܡܘܬܐ ܕܡܠܟܝܢ .

ܦܪܕ ܒܪ̈ܝܐ ܒܘܠܝܬܐ ܒܟܪ̈ܝܐ ܕܟܟܪ̈ܘ ܠܒܘܠܝܬܐ ܪ̈ܒܐ ܠܗܘܐ ܗܘ ܕܩܦܝ ܗܪܝܐ ܒܪ̈ܝܢܘܬܐ ܘܚܘܪܐ ܒܓܘܐ ܒܒܪ̈ܝܢܘܬܐ ܐܬܘܝܐ (Afferent - arteriole) . ܟܒܪ ܟܠ ܒܪ̈ܝܢܘܬܐ ܐܬܘܝܐ ܠܫܠܝܠܘܬܐ ܒܡܝܬܐ ܕܒܠܘܬܐ ܕܒܘܡܢ ܕܡܬܪܝ ܠܒܪܐ ܡܢ ܡܘܬܘܢܬܐ ܕܡܬܐ ܗܘ ܕܝܠܗ ܒܘܪܘܦܢܬܐ .



ܨܘܪܬܐ (٤ — ٩) ܦܣܩܬܐ ܐܘܪܟܝܬܐ ܕܟܘܠܝܬܐ

ܢܦܩܝܢ ܠܟܠܦܘܦܐ ܕܟܘܠܝܬܐ ܥܪܩܘܒܐ ܢܦܘܩܐ (Efferent arteriole) . ܘܡܬܦܪܫܝܢ ܡܬܦܠܓܝܢ ܚܕ ܠܚܕܐ ܡܢ ܡܫܬܘܬܦܘܬܐ ܕܡܢܬܐ ܚܕܐ ܐܪܒܥܐ ܕܟܘܠܝܬܐ . ܘܦܫܛܝܢ ܕܡܐ ܕܡܢ ܐܝܟܐ ܠܒܪܐ ܠܗ ܚܕ ܘܪܝܕܐ . ܡܬܦܫܛܝܢ ܚܕ ܡܢ ܦܪܟܐ ܪܒܐ ܕܘܪܝܕܐ ܕܟܘܠܝܬܐ .

٥ — ١ — ٢ — ܬܪ̈ܝ ܡܪ̈ܝܩܘܬܐ :

ܡܢܗ ܡܢ ܟܠ ܚܕܐ ܟܘܠܝܬܐ ܚܕ ܐܪܘܒܐ ܕܡܬܩܪܐ ܠܗ ܒܡܬܢܝܬܐ ܐܝܟ ܡܪܝܩܘܬܐ ܬܪ̈ܝ ܨܘܪܬܐ (٤ — ٧) ܘ (٤ — ٩) . ܦܣܩܬܐ ܐܪܒܥܬܐ ܕܡܪܝܩܘܬܐ ܐܝܟ ٢٥ ܣܡ . ܢܦܠ ܦܠܓܗ ܠܗ ܚܠܝܠܘܬܐ ܒܪܝܬܐ . ܘܦܠܓܐ ܐܚܪܢܐ ܠܗ ܚܠܝܠܘܬܐ ܓܘܝܢܝܬܐ . ܘܗܢܝ ܡܪܝܩܘܬܐ ܡܢܘܬܐ ܡܠܝܫܘܬܢܝܬܐ . ܡܥܒܪܝܢ ܠܡܝ̈ܐ ܕܡܝܐ .

ܡܬܘܪܝܢ ܗܠܝܢ ܠܡܝ̈ܐ ܕܡܪܝܩܘܬܐ ܡܢ ܗܠܝܢ ܥܪ̈ܩܐ ܒܪ̈ܝܬܐ ܕܟܠܝܬܐ . ܘܡܬܚܙܝܢ ܒܡܫܪܝܬܐ . ܘܠܗ̈ܘܢ ܡܣܘܟܬܐ . ܘܐܚܪܢܝܬܐ ܦܬܝܬܐ ܗܠܝܢ ܡܬܦܬܚܢ ܒܚܕ ܘܡܘܬܐ ܒܘܝܢܐ . ܘܗܘ ܗܠܝܢ ܘܡܘܬܐ ܡܪܥܝܢ ܡܬܚܙܝܢ . ܒܪ ܡܬܘܪܝܢ ܗܠܝܢ ܠܗ ܐܢܫܘܬܐ ܕܪܥܠܘܬܐ ܡܢ ܪ̈ܒܐ ܡܝ̈ܐ ܡܢ ܟܘܠܝܬܐ . ܥܒܪܝܢ ܟܘܠܝܬܐ ܟܠ ܚܕܐ . ܐܝܟ

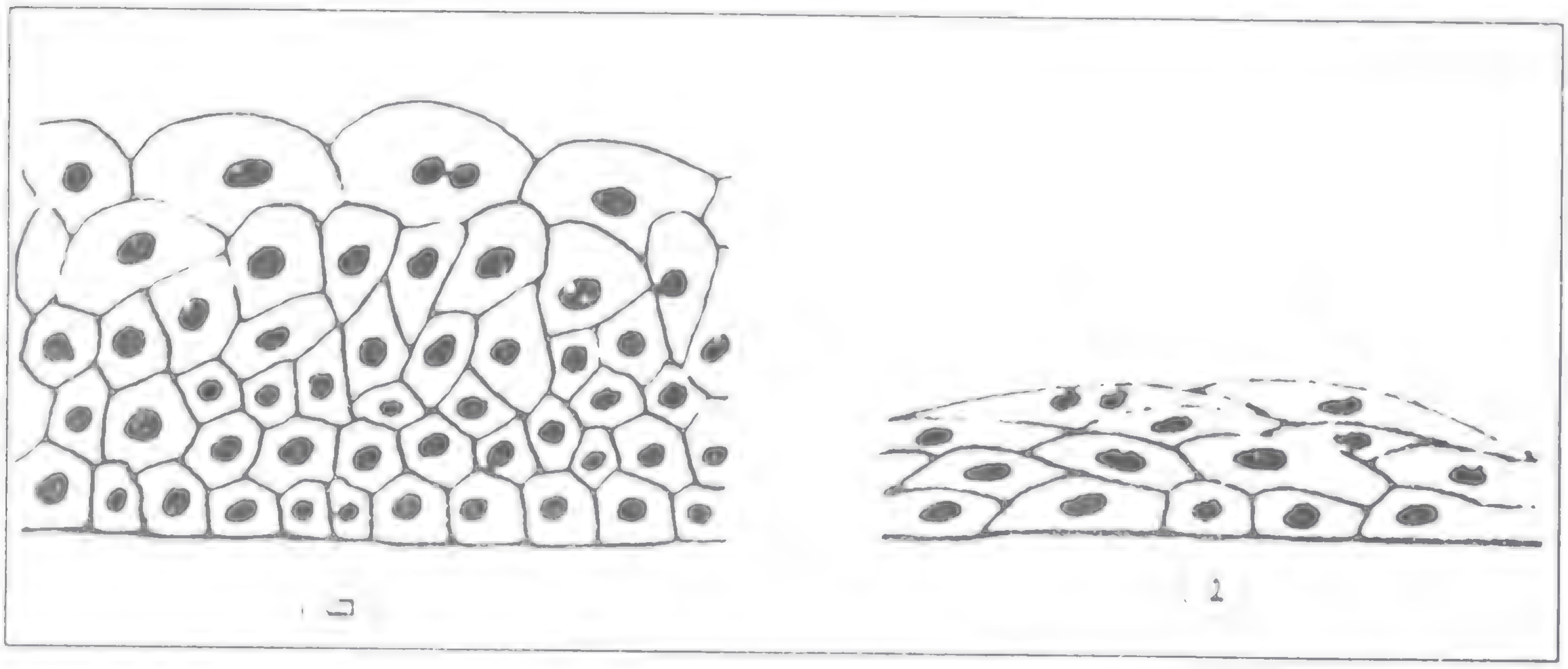
ܕܗܘܐ ܘܫܘܪܐ ܣܠܝܩܐ. ܘܗܘܐ ܡܬܘܪܬܐ ܡܢ ܗܕܐ ܫܪܪܐ ܐܝܟ ܗܠܝܢ ܫܪܪܐ ܡܢ ܟܘܠܗܝܢ ܨܘܪܬܐ (٤ - ١٠). ܐܝܟ ܕܒܥܠܡܐ ܒܡܬܕܪܫܢܘܬܐ ܡܬܘܪܬܐ ܠܘ ܡܢ ܒܡܬܕܪܫܢܘܬܐ ܕܒܝܬܐ.

٥ — ١ — ٣ — ܡܛܠܬܐ :

ܒܠܘ ܚܕ ܡܢ ܒܡܬܕܪܫܢܘܬܐ ܣܠܝܩܬܐ. ܢܦܠ ܠܗ ܣܠܝܩܘܬܐ ܕܦܫܝܛܐ. ܐܝܟ ܕܗܘܝܐ ܡܛܠܬܐ ܫܦܝܪܬܐ. ܐܝܟ ܗܘ ܗܘܐ ܒܦܢܐ ܒܦܬܐ ܕܒܐ. ܡܬܚܫܒ ܗܕܐ ܦܬܚܐ ܕܡܕܡܝܢܐ ܘܦܬܚܐ ܕܣܠܝܩܬܐ ܚܕܐ ܡܬܘܚܕܐ ܡܬܠܬܝܬܐ ܒܠܘ ܡܛܠܬܐ (Ingene) ܘܒܠܘ ܦܫܛܐ ܦܫܝܛܐ ܒܗܘܢܬܐ ܘܚܫܝܒܬܐ. ܐܦ ܐܝܟ ܕܗܘܝܐ ܡܛܠܬܐ ܫܦܝܪܬܐ.

ܠܗܕܐ ܕܡܛܠܬܐ ܡܬܘܡܝܐ ܒܠܘ ܒܠܘܕܐ ܕܡܕܡܝܢܐ. ܡܢ ܠܒܪ ܕܡܬܕܪܫܢܘ ܡܢ ܐܝܟ ܗܠܝܢ ܒܥܠܡܐ ܐܝܟ ܕܦܫܠܘܘ. ܡܬܕܪܫܐ. ܐܝܟ ܒܥܠܡܬܐ ܒܡܬܕܪܫܢܘܬܐ ܕܡܛܠܬܐ ܒܝܬ ܣܠܝܩܬܐ ܒܠܘ ܕܒܝ. ܒܕܒܝ ܒܦܬܚܐ ܕܣܠܝܩܬܐ ܚܕܐ ܒܡܬܕܪܫܢܘܬܐ ܒܫܘܪܬܐ ܕܒܝܬܐ. ܝܕܥܐ ܐܦܬܐ ܕܡܛܠܬܐ ܒܠܘ ܦܫܛܐ ܕܗܢܐ ܘܕܦܬܚܘ. ܡܫܬܡܠܝܘ ܒܕܘܐ ܦܘܠܫܐ ܒܡܬܕܪܫܢܘܬܐ ܠܗܘܢܘ ܒܣܠܝܩܐ. ܐܝܟ ܕܡܬܚܙܝ ܗܕܐ ܐܢܫܐ ܡܢ ܕܥܒܕܘܬܐ :

ܡܦܘܪܫܐ ܡܢܝܢܐ ܠܫܪܪܐ. ܘܡܦܘܪܫܐ ܒܝܬ ܣܠܝܩܐ ܕܦܠܚ ܥܠ ܦܠܚܘܬܐ ܕܒܝܬܐ. ܦܬܚ ܡܬܘܦܫܐ ܗܝܢܐ ܠܚܕܐ ܒܡܬܚܫܘܬܐ ܕܣܠܝܩܐ.



ܨܘܪܬܐ (٤ - ١٠) ܘܫܘܪܐ ܡܕܡܝܢܐ ܟܘܬܠܐ ܐܝܟ ܕܡܬܚܙܝܐ ܒܠܘ ܠܗ ܡܫܟܠܬܐ ܓܫܘܡܝܐ

٥-٢- ܡܬܪ̈ܨܬܐ ܕܟܘ̈ܠܝܬܐ :

ܥܒܕܐ ܡܢܗܘܢܝܐ ܕܡܬܪ̈ܨܬܐ ܕܟܘ̈ܠܝܬܐ ܒܬܠܬܐ ܡܫܘܚܬܐ ܗܠܝܢ ܕܪ̈ܝܢܐ ܘܐܝܬܝܐ ܕܠܡܫܬܐ ܕܪ̈ܦܩܬܐ .

٥-٢-١- ܪ̈ܙܝܬܐ (Filtaration) :

ܒܬܪ ܡܣܝܡܬܐ ܕܕܡܐ ܡܕܪܗ ܡܬܬܘܢܝܐ ܘܡܬܪ̈ܬܝܬܐ ܡܢ ܒܘܢܟܘܢܝܐ ܠܫܠܠܘܬܐ ܕܒܠܘܬܫܐ ܕܒܘܡܢ . ܘܡܢܘ ܠܐܒܘܒܘܢܐ ܐܢܝܢܐ ܦܠܫ ܠܘܦܐ ܕܡܬܘܢܝܐ ܕܒܘܟܘܢܝܐ ܘܟܪܡܬܐ ܡܠܝܬܐ ܕܒܠܘܬܫܐ ܕܒܘܡܢ . ܐܝܟ ܪ̈ܘܢܐ ܙܦܘܢܐ . ܡܬܠܐ ܟܒܪ̈ܬܐ ܕܡܬܢܘܢܝܐ ܪ̈ܘܪܒܬܐ ܕܦܪܘܬܝܢܐ . ܘܒܘܪ̈ܬܐ ܕܕܡܐ ܘܟܒܡ ܠܡܢܐ ܘܡܬܢܘܢܝܐ ܟܕ ܘܟܘܪ̈ܬܐ ܡܢ ܦܪܘܬܝܢܐ ܒܟܒܪ̈ܬܐ . ܘܡܫܡܫ ܠܪ̈ܘܢܐ ܙܦܘܢܐ . ܘܪ̈ܒܝܐ ܕܕܡܐ ܟܠܝܐ ܡܬܠܘܬܢܝܐ ܠܗ ܒܘܟܘܢܝܐ . ܘܡܢܝܬܐ ܗܠܘ ܪ̈ܘܢܐ ܡܢܘܡܐ ܠܟܠܦܐ ܒܟܘܠܝܬܐ ܒܪܘܢܐ . ܡܪ̈ܙܝ ܠܘ ܒܠܘܬܫܐ ܕܒܠܘܡܢ ܐܝܟ ٢٠ ܡܢ ܒܘܢܝܢܐ ܕܦܠܘܡܐ ܕܕܡܐ ܕܚܒܪ ܠܘ ܒܘܠܝܬܐ . ܘܗܘ ܗܠܘ ܠܘܡܢܐ ܕܡܫܢܐ ܠܐܝܟ ١٠٠ ܦܝܦܐ ܕܠܘܡܢܐ ܕܟܘܠܝܬܐ ܚܕܡܢܐ

٥-٢-٢- ܪ̈ܦܩܬܐ (Secretion) :

ܣܝܡܐ ܪ̈ܦܩܬܐ ܕܡܠܘ̈ܐܐ ܠܟܘܠܝܬܐ . ܐܝܟ ܕܠܐ ܗܠܘ ܒܢܝܐ ܙܘܦܢܘ ܒܫܦܘܦܬܐ ܠܘ ܒܠܘܬܫܐ ܕܒܘܡܢ . ܘܡܢ ܐܢܐ ܡܠܘ̈ܐܐ ܣܡܘܙܐ ܕܗܦܘܪܝܟ (Hippuric acid) ܦܝܐ ܐܢܝܬܐ ܠܡܫܬܐ ܪ̈ܕܝܐ ܡܢ ܡܠܘ̈ܐܐ ܡܢ ܐܢܝܢܐ ܡܕܡܝܐ . ܠܛܪ̈ܕܐ ܕܡܬܘܢܝܐ ܕܡܕܬܐ . ܒܪܒܝܐ ܒܐܒܘܒܘܢܐ ܒܘܠܝܬܢܐ . ܐܝܟ ܠܠܘܬܘܗܝ ܘܡܢܐ ܘܡܠܫܐ ܘܣܡܘܙܐ ܐܫܝܢܐ ܘܟܕܒܫܗ ܡܢ ܡܠܘ̈ܐܐ ܡܬܪ̈ܬܐ ܠܛܘܡܢܐ . ܘܗܘܢܐ ܐܢܝܬܐ ܕܠܡܫܬܐ ܒܢܝܬܐ ܥܠ ܐܦܐ ܕܐܪܒܥܬܐ ܕܡܠܘ̈ܐܐ ܠܡܫܝ ܐܘ ܒܫܦܘܬܗ . ܘܠܠܘܬܘܗܝ ܗܢܐ ܠܦܘܡܐ ܦܝܐ ܐܢܝܬܐ ܠܡܫܬܗ ܒܠܐܢܝܬ . ܒܕ ܠܐ ܣܝܡܝܢ ܐܢܝܢܐ ܣܘܬܡܢܐ . ܠܡܫܝ ܦܫܦܘܬܐ ܡܢܗ ܠܘ ܐܒܫܘܬܐ ܒܢܝܬܐ . ܐܝܟ ܒܪ̈ܠܐ ܐܢܝܬܐ ܕܠܡܫܬܐ ܕܡܢܐ ܒܫܦܘܬܐ ܦܠܫ ܥܠ ܢܛܪܬܐ ܕܒܡܢܐ ܒܢܝܢܐ ܠܘ ܠܘܡܢܐ .

ܘܐܦ. ܥܡ ܐܠܘ ܥܒ̈ܕܢܐ ܚܫܚܬܐ ܕܐܟܚܕܐ ܡܢ ܫܢܐ ܦܨ̈ܐ ܡܫܘܚܠܦܬܐ ܦܣܛܘܪܬܐ ܡܠܠܬܐ ܡܢܗ ܠܗ ܐܬܩܛܘܠ ܚܝܘ̈ܬܐ. ܘܐܚܪܬܐ ܚܫܚܬܐ ܕܚܝܘ̈ܬܐ ܡܕܘܦܐ. ܘܐܦ. ܒܝܕ ܐܠܘ ܥܒܕܬܐ ܕܡܢܐ. ܐܝܟ ܦܣܛܘܪܬܐ ܕܡܢܐ ܡܘܕܥܢܐ ܡܢ ܚܝܘ̈ܬܐ. ܠܗ ܐܬܩܛܘܠ ܚܝܘ̈ܬܐ. ܘܒܝܕܐ ܚܫܚܬܐ ܕܡܢܐ ܠܗ ܚܝܘ̈ܬܐ ܡܕܘܦܐ. ܐܝܬ ܠܐ ܦܪ̈ܫܐ ܚܝܬܐ ܠܡܐܟܠܬܐ ܕܡܢ ܦܣܛܘܪܬܐ ܡܢ ܡܠܘܐܐ ܐܫܬܐ ܐܝܟ ܚܕܐ.

ܡܬܚܫܚܢܐ ܗܠܝܢ ܠܗܘܢ ܡܬܚܫܚܬܐ ܕܚܠܒܐ ܡܬܚܙܝܢܘܬܐ ܕܚܠܒܐ ܕܠܡܐܟܠܬܐ ܘܕܦܣܬܐ ܡܬܩܛܠܬܐ ܗܢܐ. ܐܝܬ ܐܝܟ ܦܠܚ ܥܠ ܡܠܘܐܐ ܡܫܠܦܐ ܠܚܕ ܡܢܐ ܠܚܕܐ. ܘܟܕ ܡܕܡܐ ܕܐܬܩܛܘܠ ܚܝܘ̈ܬܐ ܚܘܡܐ ܠܗ ܚܠܒܐ ܡܬܚܙܝܢܘܬܐ. ܘܡܢ ܕܡܫܚܠܦ ܠܚܠܒܐ ܕܠܡܐܟܠܬܐ ܘܕܦܣܬܐ. ܐܝܟ ܡܬܐ ܕܐܬܩܛܘܠ ܚܝܘ̈ܬܐ. ܘܡܕܒܪ ܚܕ ܠܕܒܪܐ ܒܚܕܐ ܡܢ ܡܬܚܙܝܢܘܬܐ ܕܡܢܐ. ܚܠܒܐ ܐܝܬ ܚܠܒܐ ܡܬܚܙܝܢܘܬܐ. ܥܡܠ ܚܝܘ̈ܬܐ ܐܬܚܫܚܢ ܗܘܐ ܡܢܐ. ܘܡܕܒܪ ܠܐܬܩܛܘܠ ܡܚܘܬܐ ܐܝܟ ܕܦܠܚ ܐܝܟ ܕܡܕܡ ܠܗ ܗܠܝܢ ܕܦܣܬܘܪܝܐ ܕܡܠܒܝܒ. ܡܢܗ ܚܝܘ̈ܬܐ ܚܠܒܐ ܗܘ ܠܦܣܛܘܪܬܐ. ܚܠܒܐ ܡܬܚܙܝܢ ܚܘܡܐ ܚܕܐ ܒܗܠܝܢܐ ܕܦܣܬܘܪܝܐ.

٥ - ٣ - ܚܠܒܐ :

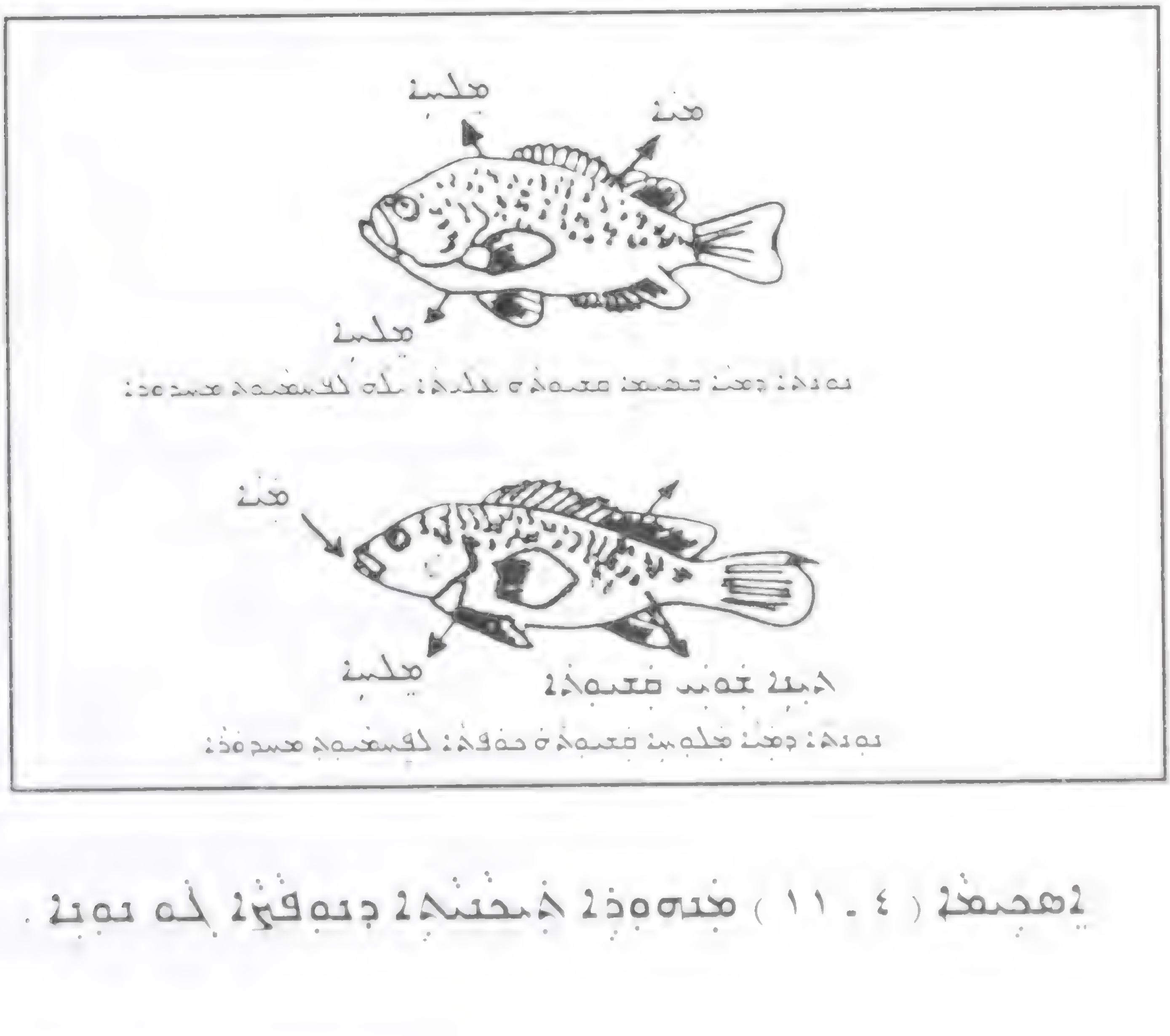
ܗܠܝܢ ܥܕܢܐ ܡܬܘܕܥܐ ܠܗ ܚܘܠܡܐ ܚܫܚܬܐ ܕܐܝܘܢܐ ܕܦܠܚܐ. ܡܕܡ ܥܕܢܐ ܢܘܡܝܐ ܚܕ ܠܚܕܐ ܘܩܠܝܠ ܡܢ ܚܝܘ̈ܬܐ. ܘܗܘܐ ܡܝܐ ܡܬܚܠܦ ܠܗܘܢ ܡܢ ܕܥܡܠ ܐܢܫܐ ܡܢ ܚܘܪܢܐ ܘܥܡܢܐ. ܠܗܘܢ ܠܠܫܢܐ ܠܡܕܝܢܬܐ ܡܬܚܫܚܢ. ܠܗܘܢ ܥܒܘܕܐ ܗܠܝܢ ܡܠܘܐܐ ܘܕܝܢ ܦܪ̈ܫܐ. ܡܢܗ ܕܡܢܐ ܘܒܕܘܟܬܐ ܠܚܠܒܐ ܚܡ : ٥ ، ٨ ܘܕܢܐ ܠܗܘ ܗܘܐ ܡܘܕܢܐ ܡܢ ܕܘܟܬܐ ٦ . ܝܘܡܢܐ ܐܝܟܢܐ ܠܚܠܒܐ ܗܠܝܢ ١.٠١٥ ܘ ١.٠٢٥ .

ܦܝܫܐ ܗܠܝܢ ܡܬܚܫܚܢܐ ܕܚܘܠܡܢܐ ܡܬܚܙܝܢܐ ܗܠܝܢ ܐܝܟ ܥܒܕܐ ܕܦܠܚܐ ܕܡܢܐ ܥܒܕܐ ܠܥܒܕܐ ܕܦܠܚܐ. ܥܠ ܕܗܘܐ ܦܣܛܘܪܬܐ ܐܝܟ ܕܚܠܒܐ ܠܗ ܡܢܐ ܚܡܝܡܐ. ܠܐ ܡܫܚܠܦ ܚܘܡܐ ܚܘܡܬܐ. ܐܝܬ ܦܣܛܘܪܬܐ ܐܝܟ ܕܚܠܒܐ ܠܗ

ܡܝ̈ܐ ܡܠܘܚܐ. ܐܘ ܠܐ ܦܝܫܐ ܢܫܬܝܐ ܡܫܟܠܝܢ ܙܒܘܢܐ ܕܦܠܛܘܬܐ ܡܢ ܡܠܚܐ ܥܕܝܦܐ. ܘܡܛܠܗܕܐ ܚܠܦ ܡܝ̈ܐ ܠܐ ܫܬܝܢ. ܟܕ ܗܘܝܐ ܕܐܝܬ ܚܠܠ̈ܐ ܡܫܬܘܕܥܝܢ ܠܡܝ̈ܐ ܕܝܡܐ. ܐܝܟ ܠܒܪܝܬܐ ܕܡܝ̈ܐ ܡܬܝܢ.

ܚܕ̈ܝ ܣܝܥܬܐ ܕܢܘܢ̈ܐ ܕܚܝܝܢ ܒܡܝ̈ܐ ܕܝܡܐ. ܟܕ ܗܘ ܗܟܢ ܦܠܚܝܢ ܠܦܠܛܘܬܐ ܡܢ ܡܠܚܐ ܥܕܝܦܐ. ܠܢܘܢ̈ܐ ܗܠܝܢ ܡܗܘܡܢܘܬܐ ܙܒܘܢܝܬܐ ܐܝܟ ܐܝܬܝܗ ܐܒܘܢܝܬܐ ܐܢܬܝܬܐ (Rectal glands) ܙܒܘܢܝܬܐ ܨܘܪܬܐ. ܗܠܝܢ ܦܠܛܝܢ ܡܠܚܐ ܒܝܕ ܚܠܠ̈ܐ ܒܡܥܘܬܐ ܡܢ ܡܝ̈ܐ ܕܝܡܐ. ܐܝܟ ܡܫܦܝ ܢܘܢܐ ܠܦܘܫܐ ܒܡܫܐ ܥܕܝܦܐ ܡܢ ܡܠܚܗ ܒܦܘܪܫܐ ܕܐܒܘܢܝܬܐ ܒܠܘܬܐ ܠܗ ܡܗܘܡܢܬܐ ܨܘܪܬܐ (٤ - ١١).

ܘܟܠܗܝܢ ܐܦ ܦܪ̈ܚܬܐ ܡܥܘܦܦܐ ܒܐܒܘܢܝܬܐ ܢܟܪܝܬܐ ܠܗ ܣܝܥܬܐ ܐܚܪܬܐ ܒܦܘܪܫܐ ܕܡܗܘܡܢܬܐ. ܘܠܗ ܐܝܬ ܐܚܪܬܐ ܗܘܝ ܒܠܘܬܐ ܒܓܘܦܐ ܠܡܢܬܐ ܕܠܐ ܒܡܥܘܬܐ (Aglomerular). ܡܠܝܠܬܐ ܐܢܫܘܬܐ ܠܗ ܢܘܦܩܐ. ܟܕ ܡܦܩܝܢ ܦܘܠܚܢܗ ܥܠ ܐܒܘܢܝܬܐ ܦܪܝܫܬܐ ܡܕܝܢܬܐ. ܕܢܝܢܝܬܐ ܘܦܠܛܬܐ. ܐܝܟ ܕܚܙܝ ܥܠ ܢܘܢܐ ܢܡܘܣܐ ܐܒܘܢܝܬܐ ܢܚܝܪܝܬܐ (Nasal glands). ܠܦܠܛܬܐ ܕܡܠܚܐ ܥܕܝܦܐ



ܨܘܪܬܐ (٤ - ١١) ܡܥܘܦܦܐ ܐܒܘܢܝܬܐ ܕܢܘܦܩܐ ܠܗ ܢܘܢܐ.

ܢܦܠܬ ܐܝܢܐ ܗܢܕܢܝܬܐ ܠܗ ܟܬܘܦܐ ܗܢܐ ܕܠܘܩܕܡ ܡܟܣܝܬܐ. ܘܦܫܛ
ܗܘܝܢܫ ܠܗ ܫܠܝܠܘܬܐ ܕܢܫܟܪܐ. ܐܝܢܐ ܢܦܠܬ ܠܗ ܦܚܕܐ ܟܠ ܫܘܦܐ.
ܘܦܫ ܗܘܝܢܫ ܐܕܝܐ ܗܘܕܝܐ ܡܢ ܦܘܡܐ. ܟܕ ܐܝܬ ܙܠܦܐ ܕܡܚܬܐ ܠܕܝܐ
ܕܢܣܕܘܪܐ. ܘܡܙܝܢܬܐ ܠܗ ܫܟܡܬܐ ܠܗܝ ܫܘܢܬܐ ܕܕܦܢܬܐ ܡܠܝܢܬܐ.
ܡܫܘܚܬܐ ܡܢ ܕܝܢܐ ܕܢܣܕܘܪܐ ܕܐܝܬܐ ܦܚܕܐ.

ܐܝܢܐ ܫܠܝܢܬܐ ܗܕܐ ܕܝܢܐ ܠܗܝ ܗܘܢܐ ܠܗܘ. ܡܘܠܕܐ ܡܕܝܢ ܡܦܩܘܬܐ
ܟܠܝܐ ܗܝܦܕܬܐ ܗܡܢܐ ܘܡܗܘܬܐ ܕܐܝܢܐ. ܘܐܝܬ ܫܟܝܢ ܘܫܕܬܐ ܗܢܕܝܡܘܬܐ
ܕܐܗܘܗܘܢܐ ܐܝܢܐ.

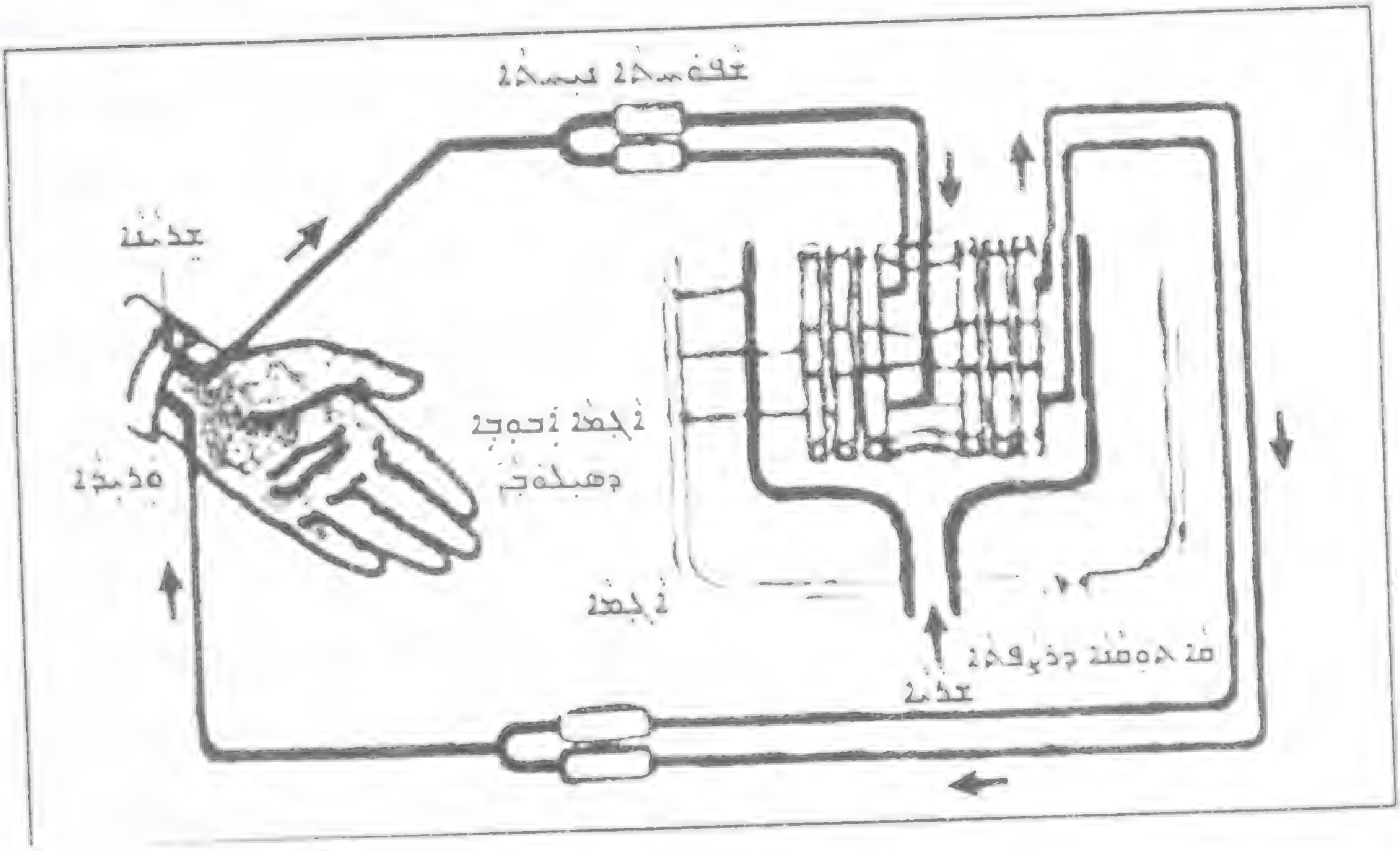
ܘ.ܒ - ܡܘܠܕܐ ܐܘܡܢܝܬܐ :

ܦܝܠܘ ܡܬܘܕܙܬܐ ܗܝܢܐ ܐܫܟܚܬܐ ܡܢܐ ܕܦܝܢܐ ܡܗܘܡܘܬܐ ܗܡܘܠܕܬܐ
ܐܘܡܢܝܬܐ. ܗܘ ܕܦܝܢܐ ܡܘܦܠܚܬܐ ܠܗܡܡܡܬܐ ܕܫܕܡܢܐ ܡܕܟܢܐ ܕܡܘܠܕܬܐ
ܗܢܕܝܬ. ܘܗܕܢܐ ܫܕܡܢܐ ܠܗܝ ܕܟܠܝ ܗܕܗܝ ܡܘܠܕܬܐ ܡܢ ܦܘܠܚܢܐ. ܡܢ
ܟܠܬܐ ܕܡܬܠܗܝܢܘܬܐ ܐܘ ܟܡܘܠܐ ܐܫܕܝܐ. ܘܡܙܝܢܬܐ ܠܗ ܗܝܢܐ ܐܝܟܢܘܬܐ
ܦܕܡܬܐ ܕܫܢܐ ܕܡܕܝܢܐ. ܗܡܦܠܚܬܐ ܕܡܘܠܕܬܐ ܐܘܡܢܝܬܐ. ܗܘ ܕܦܠܚܢܐ
ܠܡܬܕܙܬܐ ܕܐܘܡܟܢܐ ܕܕܡܢܐ. ܘܦܕܡܬܗ ܡܢ ܝܬܝܕܘܬܐ. ܗܠ ܕܗܡܫ ܗܕܗܝ
ܡܘܠܕܬܐ. ܘܕܟܕܗܝܫ ܠܦܘܠܚܢܗ ܗܢܝܢܐ. ܦܠܚܢܐ ܡܘܠܕܬܐ ܐܘܡܢܝܬܐ
ܗܡܬܘܕܘܬܐ ܕܕܦܢܬܐ ܗܦܕܡܬܐ ܫܠܝܢܬܐ. ܘܠܗܘ ܗܘܐ ܡܙܟܝܐ ܕܦܕܡܬܐ
ܕܡܠܘܐܐ ܗܫ ܗܕܗܝ ܗܕܢܐ ܦܕܝܢܐ ܗܠܟܢܐ ܡܢ ܗܝܠܘܗܝ. ܟܠܢܐ ܠܠܘܗܡܢܐ
ܕܡܢܬܘܢܝܬܐ ܕܡܠܘܐܐ ܦܗܕܐ ܠܗ ܗܕܗܝ ܗܕܢܐ. ܘܡܢܬܘܢܝܬܐ ܗܝ ܘܟܘܕܢܬܐ
ܐܢܫ ܝܠܗ ܗܝ ܡܙܝܢܬܐ ܟܠ ܟܕܕܬܐ ܡܢ ܠܗ ܫܕܘܕܐ ܕܫܠܟܢܐ. ܐܝܢܐ
ܡܢܬܘܢܝܬܐ ܗܝ ܟܘܕܢܬܐ ܠܐ ܡܙܝ ܟܕܕܬܐ ܗܫܕܘܬܐ ܡܢ ܠܗܘ.

ܦܝܢܐ ܝܠܗ ܡܬܘܕܙܐ ܗܘܡܐ ܕܝܢܐ ܡܢ ܡܘܠܕܬܐ ܐܘܡܢܝܬܐ ܡܢ ܫܕ ܐܗܘܢܐ
ܦܗܠܐ ܕܘܝܫ ܝܚܫܐ ܡܢ ܗܝܠܘܗܝ، ܐܘ ܡܝܢܢܐ ܕܐܗܘܢܐ، ܦܡܝܕܐ ܠܗ ܫܕ
ܐܦܡܐ. ܐܝܬ ܠܗܘ ܗܕܢܐ ܡܠܫܢܐ، ܗܝܕܗܘܢܝܬܐ ܕܠܘܩܕܡܬܐ ܕܙܘܦܝܘܗ

ܘܦܘܠܚܢܗ̇ (ܒܡܣܥܘܢܘܬܐ ܕܐܝܬܘܗܝ ܠܗ ܕܡܐ ܕܒܪܢܫܐ . ܘܡܥܘܕܝܬܐ ܢܝܫܬܐ ܘܗܘܡܢܐ ܕܙܪܢܐ .

ܠܒܪ ܟܘܠܝܬܐ ܐܘܡܢܝܬܐ ܕܡܐ ܟܢܝܫܐ ܡܢ ܥܪܩܐ ܕܐܝܕܐ ܕܡܪܝܥܐ ܠܓܘ ܨܘܒܐ ܡܢܝܐ ܒܡܥܘܕܝܬܐ ܢܝܫܬܐ . ܘܗܪܟܐ ܗܘܝܐ ܠܨܘܒܐ ܕܣܝܠܘܦܢ . ܒܗܝ ܥܕܢܐ ܗܪܐ ܡܬܦܠܛܢ ܕܡܠܚܐ ܥܡ ܕܡܐ ܘܥܕܢܐ ܡܠܝܐ . ܟܕ ܦܪܫ ܕܡܐ ܡܢ ܨܘܒܐ ܕܡܠܚܐ ܡܢܟܝܐ (ܐܝܟ ܗܡܛܝܢܐ ܐܘ ܡܠܚܐ ܥܕܝܢܐ ܡܢ ܡܫܡܠܝܘܬܐ ܕܦܓܪܐ) . ܒܬܪ ܡܬܕܟܝܢܐ ܕܡܐ ܗܪܐ ܡܬܦܢܐ ܠܥܪܩܐ ܕܐܝܕܐ ܕܡܪܝܥܐ ܡܢ ܠܗ ܨܘܒܐ . ܐܝܟܢܐ ܕܝܢ ܕܐܝܟܐ ܒܬܪ ܡܬܥܒܕܐ ܠܗܘܡܢܐ ܕܙܪܢܐ . ܕܢܗܘܐ ܠܗ ܕܗܪܝܢ ܠܐܝܟܐ . ܡܬܠܝܐ ܠܡܥܘܕܝܬܐ ܕܢܝܫܬܐ . ܘܠܐ ܒܬܪ ܡܬܡܨܝܐ ܗܘܡܢܐ ܕܟܘܠܝܬܐ ܐܘܡܢܝܬܐ ܒܡܪܥܐ ܢܘܦܪܐ ܕܫܢܝܐ . ܐܠܐ ܠܫܢܝܬܐ ܡܫܡܫܢܝܬܐ . ܥܕܐ ܠܗ̇ ܥܠ ܚܕܐ ܫܢܬܐ ܢܘܡܝܢ . ܒܬܪ ܡܬܘܠܕܐ ܠܗܘܢ ܕܡܐ .



ܨܘܪܬܐ (٤ ـ ١٢) ܟܘܠܝܬܐ ܐܘܡܢܝܬܐ

٥ - ٦ - ܘܪܒܝܬܐ ܕܡܘܠܕܬܐ :

ܡܘܠܕܬܐ ܐܝܟ ܟܠ ܥܒܕܐ ܡܢ ܥܒ̈ܕܐ ܕܦܓܪܐ ܕܒܪܢܫܐ . ܒܠܚܘܕ ܐܠܐ ܚܕܡܢܐ ܕܡܘܕܐ ܠܐܢܫܐ . ܘܬܪܝܢ ܒܡܠܟܐ ܕܡܘܠ̈ܕܢܐ ܕܡܘܠܕܬܐ . ܘܣܢܝܩܬܐ ܐܢܬܬܐ ܩܕܡ ܡܘܠܕܬܐ ܥܘܠܬܐ ܡܢ ܟܪܣܐ ܕܡܘܠܢܗ . ܒܦܪܘܩܬܐ ܕܦܓܪܐ ܡܢ ܡܥܐ ܡܫܡܠܝܢܐ . ܘܒܐܝܗ ܐܢܬܬܘܬܐ ܘܠܐ ܟܪܣܐ ܕܫܘܠܡܬܐ ܪܘܡܝܢܝܬܐ ܠܡܫܬܐ ܕܡܘܠܕܬܐ .

ܒܠܚܘܕ ܩܕܡ ܕܡܥܕܪܝܢ ܥܕܝ ܡܘܠܕܬܐ . ܘܒܐܝܗ ܐܢܬܬܘܬܐ ܘܡܬܠ ܡܠܬܐ ܠܝܢܐ ܕܡܬܥܠܐ . ܩܕܡ ܘܪܝܚܬܐ ܡܠܝܗ ܡܘܠܕܬܐ ܡܢ ܚܕ ܦܪܨܘܦܐ ܕܝܠܗ ܫܠܝܡ ܦܓܪܐ . ܕܦܠܝܓ ܥܕܝ ܡܘܠܕܗ ܒܝܘܡܬܢܘܬܐ ܘܡܬܥܕܪܘܬܐ . ܘܠܝܬ ܗܟܢܐ ܡܬܠܐ ܥܠ ܡܢܝ ܕܒܝܬ ܒܡܘܠܕܬܗ . ܡܛܠ ܗܕܐ ܡܘܠܕܬܐ ܥܠܝܡܬܐ ܡܬܠܝܬܐ ܠܗ ܕܟܪܣܐ ܕܡܘܠܢܗ ܠܗ ܦܓܪܐ ܕܒܪܢܫܐ . ܘܗܟܢܐ ܐܝܬ ܪ̈ܟܐ ܦܪܨܘܦܐ ܚܠܝ ܒܗܕܐ ܡܘܠܕܬܐ . ܘܡܛܠ ܒܗܢܐ ܒܝܘܡܬܐ ܡܪܝܪܬܐ .

ܫܘܐܠܐ ܕܦܘܫܩܐ ܕܫܒܥܐ (ܫܘܩܐ)

١ - ܟܬܘܒ ܫܪܫܘܬܐ ܠܫܪܒܐ ܕܗܠܝܢ ܕܡܠܬܐ ܗܢܝܢ :

ܫܠܝܛܘܬܐ ܡܫܡܫܢܝܬܐ . ܚܘܒܬܐ ܠܡܙܒܢܘܬܐ . ܡܠܝܐ ܕܒܠܚܘܕ ܠܗ ܩܘܡܐ ܚܘܠܡܢܐ . ܚܘܒܬܐ ܬܓܘܪܬܢܝܬܐ . ܡܬܓܪܐ ܬܪܘܡܬܐ . ܐܘܪܚܐ ܕܡܠܟܘܬܐ .

٢ - ܟܬܘܒ ܠܡܬܘܒܐ ܕܡܢܐ ܠܗ ܐܡܝܢܐ .

٣ - ܡܢܘܕ ܒܐܘܪܚܐ ܐܝܟ ܕܡܬܦܠܚܐ ܠܗܘܢ ܬܓܪܐ ܠܦܪܘܩܐ ܡܢ ܬܓܪܘܬܗ .

٤ - ܦܫܘܩ ܒܟܠ ܒܪܬܐ ܕܬܪܬܝܢ ܫܠܝܛܘܬܐ ܡܫܡܫܢܝܬܐ ܠܗ ܦܪܢܣܘܬ ܘܡܘܬܪܐ ܠܡܙܒܢܬܐ ܠܗ ܚܘܠܡܢܐ ܕܒܪܢܫܐ .

٥ - ܡܫܠܡ ܡܢܐ ܕܒܗܠܝܢ ܗܢܝܢ :

ܐ - ܠܬܘܬܐ ܕܫܠܝܛܘܬܐ ܡܫܡܫܢܝܬܐ ܠܗ ܐܡܝܢܐ ܦܪܢܣܬܐ .

ܒ - ܐܝܬܘܗܝ ܕܐܪܙܐ ܕܡܠܝܐ ܡܬܬܦܢܝܐ ܣܓܝ ܚܘܒܬܐ ܬܒܥܐ ܠܗܪܡܐ ܕܫܘܩܐ ܠܗ ܚܘܠܡܢܐ ܕܐܪܥܐ .

ܓ - ܗܘܝ ܫܘܡܐ ܐܚܘܬܐ ܠܬܓܪܐ ܬܪܘܡܬܐ ܠܡܬܐ .

ܕ - ܪܦܝ ܢܚܬܐ ܬܬܓܪܬܐ ܪܒܐ ܝܬܝܪ ܩܘܪܒܐ ܡܢ ܡܢܐ ܕܪܦܝܠܗܘܢ ܚܘܫܒܐ .

ܗ - ܠܐ ܚܒܝܒܬܐ ܕܢܚܝܬܐ ܒܬܬܓܪܬܐ ܫܡܫܢܝܬܐ . ܕܦܩܕ ܡܬܘܪܬܐ ܠܗ ܠܡܬܩܢ .

ܘ - ܪܘܚܘܬܐ ܕܦܪܫܬܐ ܕܪܚܡܐ ܠܗ ܡܠܚܘܡ ܦܢܝܬܐ ܕܐܫܝܕܐ ܐܪܥܬܐ .

ܙ - ܡܘܪܟܐ ܗܢܐ ܬܬܓܪܬܐ ܝܬܝܪܐ ܠܪܚܡܐ ܐܝܟ ܕܚܙܐ ܥܠ ܝܕܥܬܐ ܕܫܩܠܝ ܡܢ ܡܢܐ .

٦ - ܡܢܘܕ ܠܡܬܓܪܐ ܪܒܬܐ ܠܫܠܝܛܐ ܕܢܚܝܬܐ .

٧ ـ ܡܠܝ ܠܡܫܝܡܘܬܐ ܕܒܬܪܐ ܡܢܐ :

ܐ ـ ܡܬܘܕܝܐ ܡܢܐ ܢܗܝܪܘܬܐ ܡܕܝܢܬܐ ܗܘ ܦܪܨܘܦܐ ܡܢ ______ ܘ

ܘ

ܒ ـ ܡܬܘܕܝܬܐ ܡܠܬܐ ܣܓܝܐܬܐ ܒܦܪܨܘܦܐ ، ܢܦܪܝܫܘܢ ܡܢ ܦܘܡܐ ܕܒܬܪܐ ܡܢܐ ______ ܘ ______ ܘ ______ ܘ

ܓ ـ ܡܢܝܢܬܐ ܡܠܬܐ ܣܓܝܐܬܐ ܕܡܘܪܬܐ ܠܦܬܓܡܐ ܠܗ ܡܘܠܟܢܐ ______ ܘ

ܕ ـ ܦܬܚ ܐܝܘܦܐ ܕܡܠܟܝܢ ܠܗ ܦܫܝܩܐ ܒܫܘܠܐ ______ ܡܢ ܒܘܪܟܐ ܦܬܓܡܐ

٨ ـ ܬܡܗ ܠܝܘܩܪܐ ܒܕ ܡܬܘܡܪܐ ܠܟܘܡܘܪܐ ܒܪܘܡܐ ؟

٩ ـ ܡܢܐ ܝܠܦܬ ܡܠܬܐ ܦܫܝܛܬܐ ܒܡܬܕܪܫܬܐ ܕܝܘܡܐ ܘܬܢܐ ܒܗ ܒܪܐ ؟

١٠ ـ ܠܡܢܐ ܡܬܝܡ ܡܫܘܢ ܕܡܠܦܢܐ ܕܡܘܠܟܢܐ ܦܪܕܝܫܢܐ ܘܕܠܦܢܐ ܘܠܒܢܐ ؟

١١ ـ ܡܬܝܡ ܠܪܘܡܢܐ ܕܠܘܕܐ ܕܡܕܝܢܬܐ .

١٢ ـ ܦܫܛ ܒܝܬ ܡܕܝܢܬܐ ܘܡܬܢܝܐ ܡܢ ܠܒܢܐ ܕܪܘܡܢܐ ܘܝܕܥܬܐ .

١٣ ـ ܡܢܝ ܠܣܒܝܬܐ ܕܗܝܢܐ .

ܦܢܘܢܐ ܚܡܝܬܐ

" ܪܘܡܐ "

ܬܫܥܝܬܐ ܥܬܝܩܬܐ .

ܪܘܡܐ ܐܝܬܝܗ̇ ܚܕܐ ܡܢ ܡܕ̈ܝܢܬܐ ܪܘܪ̈ܒܬܐ ܕܥܠܡܐ . ܘܡܠܝܗ̇ ܚܕܐ ܪܘܡܐ ܪܘܡܐ ܡܢ ܐܪ̈ܥܐ ܦܪ̈ܝܫܬܐ ܒܬܫܥܝܬܐ ܥܬܝܩܬܐ ܡܢ ܙܒܢܗ . ܫܘܪܝܗ̇ ܗܘܐ ܒܪܘܡܢܐ ܐܘ ܒܡܘܬܒܐ ܡܢ ܡܠܟ̈ܐ ܕܟܠܕܝܐ . ܐܘ ܡܢ ܩܕܡ ܠܫܢܐ ܕܢܝܫܘܬܐ ܡܢ ܢܝܫܘܬܐ ܕܡܫܝܚܝܘܬܐ . ܡܠܟܘܬܐ ܡܪܡܪ̈ܢܝܬܐ ܐܘ ܡܫܡܪ̈ܢܝܬܐ . ܘܡܠܟܐ ܗܘܐ ܪܘܡܐ ܕܐܘܓܘܣܛܘܣ . ܠܗ ܡܠܘܐܐ ܚܕܐ ܒܟܢܫܐ ܕܡܕܝܢܬܐ . ܐܘ ܪܘܡܐ ܕܚܕ ܩܘܪܝܐ ܡܢ ܩܘܪ̈ܝܐ ܕܐܝܛܠܝܐ . ܒܫܘܠܛܢܐ ܠܥܡ̈ܡܐ ܕܩܘܪ̈ܝܐ . ܐܘ ܟܘܪ̈ܝܐ ܕܐܝܛܠܝܐ ܒܡܠܟܘܬܗ ܡܢ ܕܘܟܬܐ ܠܐܪܥܐ . ܘܡܠܟ ܥܠܝܗ̇ ܐܢܫܝܢܘܬܐ ܪܒܐ ܐܝܟ ܚܕܐ ܡܫܝܚܘܬܐ ܡܢ ܗܘܦܟܐ . ܕܫܒܩ ܟܠ ܥܡܡܐ ܡܘܫܠܡܐ ܘܡܫܝܚܘܬܐ ܡܫܬܠܛܢܐ . ܫܒܩ ܪܘܡܐ ܟܘܪ̈ܝܐ . ܡܟܝܢܬܐ ܕܐܝܛܠܝܐ ܡܢ ܕܘܟܬܐ ܠܐܪܥܐ . ܘܡܫܘܕܥܢܐ ܕܦܪ̈ܝܫܐ ܐܝܬܘ ܡܢ ܐܪ̈ܥܐ ܠܐܪܥܐ . ܐܝܟܐ ܪܘܡܐ ܕܡܕܝܢ̈ܬܐ . ܐܝܬܘ ܪܘܡܐ ܕܚܕ ܩܘܪܝܐ ܡܢ ܐܝܛܠܝܐ ܡܢ ܙܘܓܐ ܠܐܪܥܐ .

ܘܐܝܬ ܐܝܟ ܗܕܐ ܐܦ ܐܢܫܘܬܐ ܠܡܫܡܠܝܘܬܐ ܕܪܘܡܐ ܟܘܪ̈ܝܐ ܐܝܬܘܗܝ : ܡܕܡܐ . ܟܘܠܦܐ ܕܐܬܚܡܐ ܕܐܝܛܠܝܐ .

ܕܐܦ . ܒܡܕܘܬܐ ܕܢܡܘܣܐ ܕܡܠܟܐ . ܐܝܟ ܗܘܬܐ ܠܗ ܡܠܟܐ ܘܡܠܝܟܐ ܠܗ ܦܪܝܫܘܬܐ . ܘܫܠܚܐ ܡܢ ܡܠܟ̈ܐ ܠܗ ܡܕܒܪܢܘܬܐ . ܘܢܡܘܣܐ ܒܟܘܡܪ̈ܘܬܐ . ܐܝܟ ܡܫܡܫܢܐ ܪܘܡܝܐ ܠܗ ܕܡܠܟܐ ܫܠܝܛܢܐ . ܘܐܡܠܐ ܐܟܘܬܐ ܠܗ ܟܘܡܪܐ ܘܡܕܒܪ ܀.

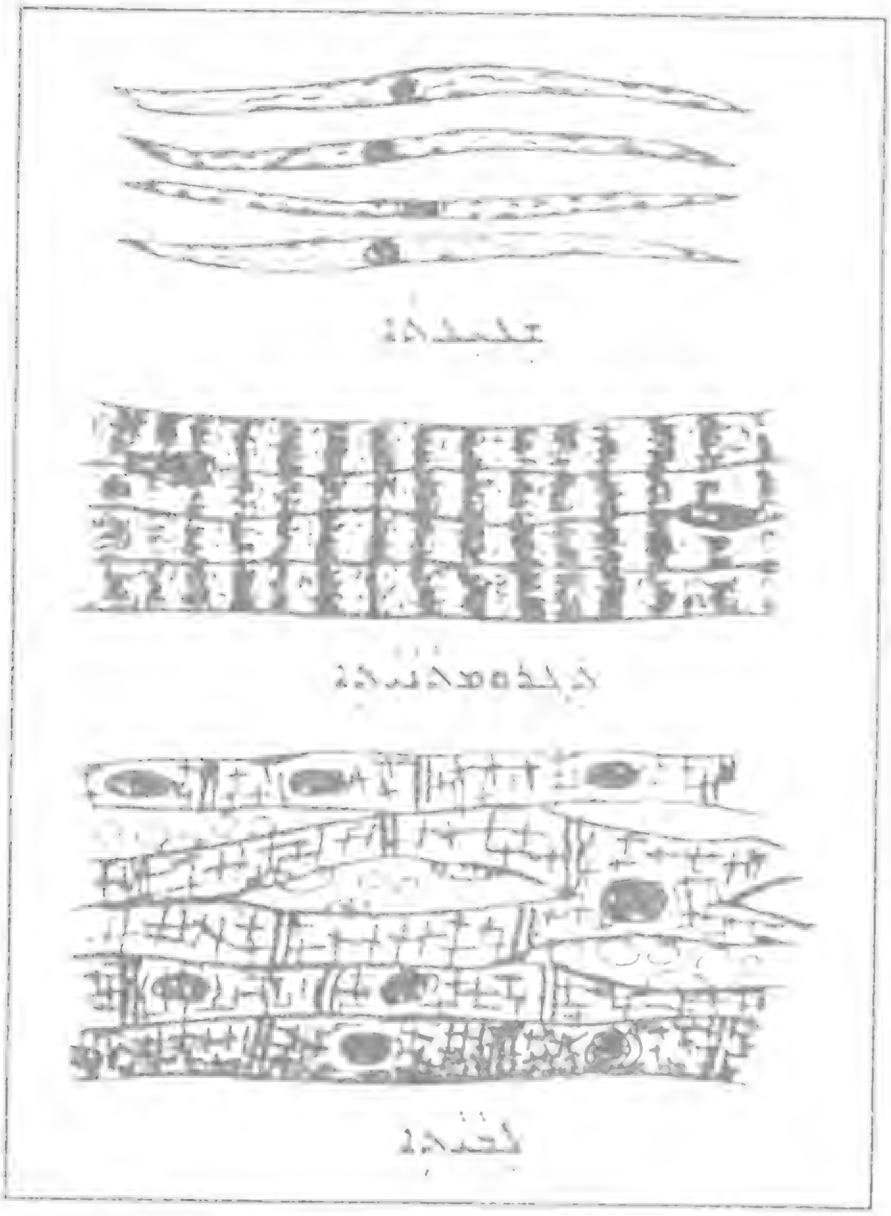
ܘܫܢܬܐ ܡܫܝܚܝܬܐ ܕܐܦ ܐܢܫܘܬܐ ܫܒܝܚܬܐ ܟܠ ܗܕܐ ܟܘܡܪ̈ܐ . ܠܐܝܛܠܝܐ ܕܚܘܐ . ܘܡܫܟܚ ܕܝܢܐ ܒܗ ܪܘܡܐ . ܘܡܢ ܠܘܩܒܠ ܫܒܝܚ ܗܘܬܐ ܘܡܠܝܟܐ ܘܫܠܚܐ ܡܢ ܡܠܟ̈ܐ ܠܚܕܐ ܘܟܘܪ̈ܐ ܕܪܘܡܝ ܠܗ ܚܕ ܡܫܝܚܐ ܡܠܟܐ ܐܘ ܕܡܠܟܐ . ܐܝܟܐ ܚܘܬܐ ܒܪ ܕܘܟܬܐ ܗܢܘܢ ܠܟܘܪܬܐ ܡܦܪܫܢܝܬܐ ܐܘ ܟܘܡܪܢܝܬܐ ܫܠܝܛܬܐ .

٢ ـ ܐܘܪ̈ܓܢܐ ܕܙܘܥܐ ܠܘܬ ܚܝܘܬܐ

ܒܝܕ ܚܝܘܬܐ ܠܗ ܫܘܢܝܐ ܡܢ ܕܘܟܬܗ . ܒܡܨܥܬܐ ܕܚܕ ܐܘܪ̈ܓܢܐ ܕܙܘܥܐ . ܐܝܟ ܥܘܩܒܪ̈ܬܐ ܡܫܚܠܦܐ ܙܢ̈ܝܗ . ܘܥܘܩܒܪ̈ܬܐ ܐܝܬܝܗ̇ ܬܠܬܐ ܐܝܟ ܕܗܠܝܢ

٢ ـ ١ ـ ܥܘܩܒܪ̈ܬܐ ܢܥܝܡܬܐ :

ܡܬܩܪܝܐ ܗܠܝܢ ܥܘܩܒܪ̈ܬܐ ܢܥܝܡܬܐ ܡܢ ܒܘܪܐ ܕܫܠܕܐ ، ܕܥܘܩܒܪ̈ܝܬܐ . ܐܪܝܟܬܐ ܘܡܚܠܠܬܐ . ܐܣܟܡܐ ܒܐܝܕ̈ܐ ، ܐܣܟܡܐ (٥ ـ ١) ܘܡܦܩܢ ܚܕ ܫܘܪܐ ܒܐܣܟܡܐ ܒܗܘܝܐ . ܕܡܬܬܪܝܢ ܠܗܘܢ ܐܠܝܦܘܬܐ ܐܘ ܣܘܪ̈ܝܢܝܬܐ . ܦܪ̈ܫܝܢ ܡܢ ܠܗ ܦܪ̈ܫܢܝܬܐ . ܒܠܐ ܐܫܬܡܗ ܒܐܘܪ̈ܓܢܐ ܓܘܢܝܬܐ ، ܘܐܝܟ ܗܠܝܢ ܠܐ ܨܒܝܢܝܬܐ . ܘܡܦܩܢ ܙܘܥܐ . ܘܡܬܚܝܢ ܢܥܝܡܬܐ ܕܠܒܪ ܡܢܗܝܢ ܒܝܢܗ . ܟܠ ܒܘܠܥܐ ܕܡܘܪܘܟܐ ܘܫܪܝܬܐ ܕܡܦܩܬܐ ܠܗܘܢ . ܐܝܟ ܥܘܩܒܪ̈ܬܐ ܢܥܝܡܬܐ ܠܗ ܠܘܩܒܠ ܕܡܪܕܝܬܐ ܗܕܡܐ ، ܐܝܟ ܒܐܝܕܐ ܦܬܝܐ . ܘܟܠܝܬܐ ܕܡܥܝܐ ܘܫܡܝܐ .



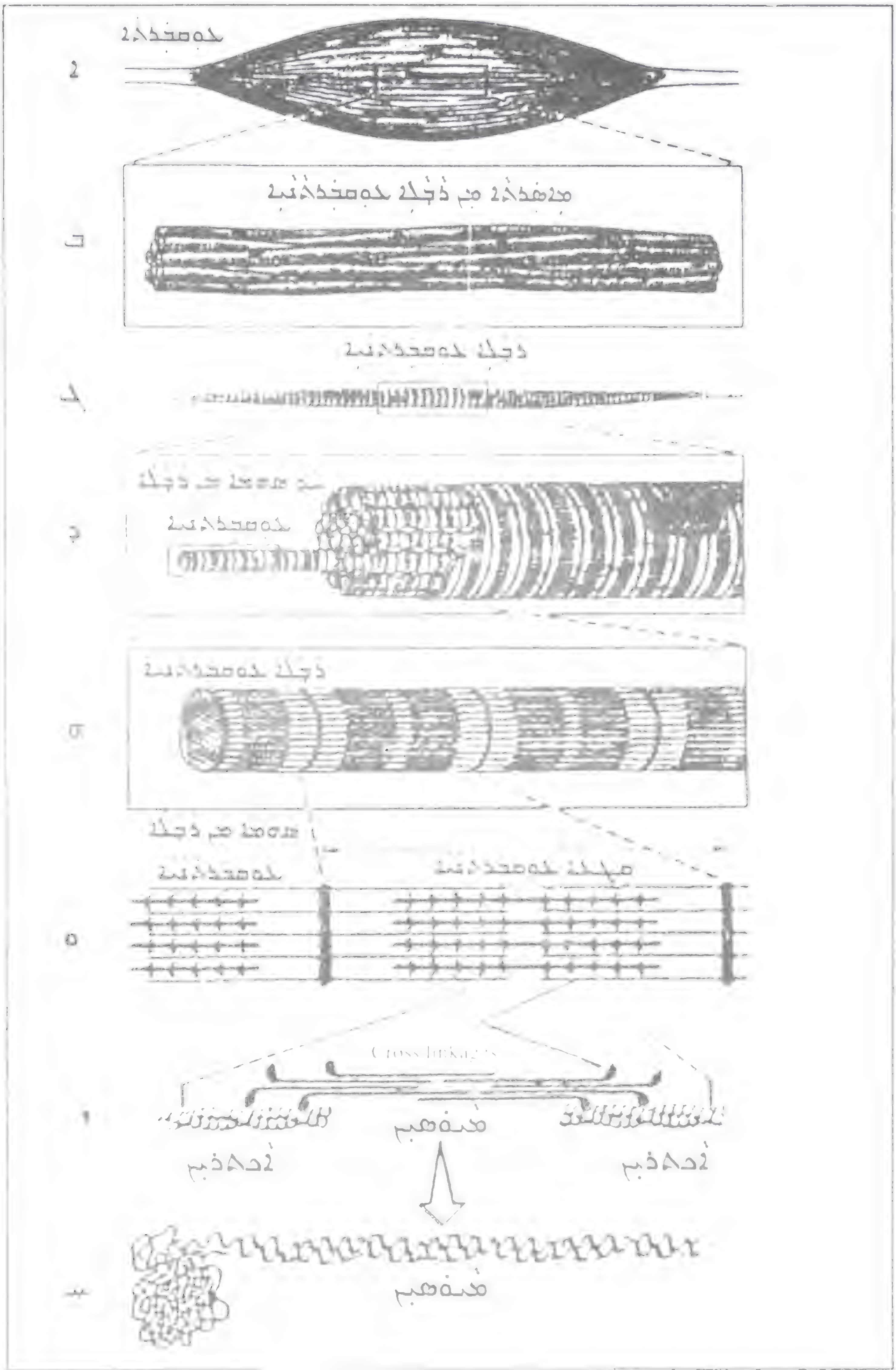
ܐܣܟܡܐ (٥ ـ ١) ܙܢ̈ܝܐ ܕܥܘܩܒܪ̈ܬܐ

٢ — ٢ - ܥܘܣܒܪܬܐ ܐܣܟܠܛܘܢܝܬܐ :

ܡܫܘܕܥܬܐ ܗ̇ܝ ܥܘܣܒܪܬܐ ܐܣܟܠܛܘܢܝܬܐ ܡܢ ܡܢܝܢܐ ܣܘܓܐܐ ܕܥܘܣܒ̈ܪܬܐ (ܡܬܩܪܝܢ ܥܘܒ̈ܕܐ ܡܢ ܣܘܓܐܐ ܕܥܘܣܒ̈ܪܬܐ ، ܐܝܟ ܕܡܣܘܝܕܠܗܘܢ ܒܗܠܡܬܐ ܕܝܠܗܘܢ ܥܕ̈ܡܐ ܒܝܕܗܘܢ) ، ܘܒܝܠܗ ܟܠ ܚܕܐ ܢܩܒܐ ܢܩܒ̈ܢܐ ، ܐܝܟ ܗܘܕܘܦܠܘܢ ܥܠ ܡܢܝܢܐ ܕܓܘܪ̈ܐ ܡܢ ܓܪ̈ܡܐ ، ܐܘܠܝܢ ܕܥܒܕܐ ܒܥܒܕܬܐ ܕܡܢܬܐ ܡܢ ܡܬܠܪ̈ܘܗܝ ، ܘܐܝܟ ܡܥܒܕܐ ܗܢܐ ܠܝܘܠܦܢܐ ܕܟܠܐ . ܡܬܥܒܕ ܥܘܒ̈ܕܐ ܕܟܠܐ ܐܢܫܐ ܥܡ ܚܕܕܐ ܚܕܐ ܡܬܩܪܝܐ ܥܘܣܒܪܬܐ ، ܘܡܬܥܒܕ ܡܬܩܪܝܢܐ ܥܡ ܡܠܝܐ ܡܢ ܡܘܕܐ ܐܚܪܬܐ ܥܘܣܒܪܬܐ . ܘܥܘܣܒ̈ܪܬܐ ܐܣܟܠܛܘܢܝܬܐ ܕܒܢܝܢܐ ܗܢܐ ، ܐܝܟ ܥܒܕܐ ܐܚܪܢܐ ܥܡ ܓܪ̈ܡܐ ܓܘܪܬܐ . ܘܠܗ ܬܘܪܐ ܡܬܡܣܟ ܐܚܪܢܐ ، ܐܝܟ ܠܓܪ̈ܡܐ ܘܡܢܬܐ ܘܒܬܪܗ ، ܘܥܠ ܕܐܝܟ ܡܬܥܒܕܢܐ ܗܢܐ ܒܟܘܡܫܬܐ ܕܒܢܝܢܐ ܗܕܡ̈ܐ ، ܡܬܠܐ ܐܝܟ ܡܬܥܒܕܘܬܐ ܒܝܕ ܡܬܩܪܝܢܐ ܗ̇ܝ ܡܢ ܥܘܣܒ̈ܪܬܐ ܐܣܟܠܛܘܢܝܬܐ .

ܘܡܘܕ ܐܢܫܘܬܐ ܕܥܘܒ̈ܕܐ ܕܡܢܐ ܠܟܠܐ ܥܘܣܒ̈ܪܬܐ ܐܣܟܠܛܘܢܝܬܐ ، ܠܗ ܐܘܪܚܘܬܐ ܕܦܩܘܕܘܬܐ ، ܘܟܠܐ ܕܦܝܫ ܕܒܢܝܢܐ ܡܬܥܒܕ ܡܢ ܐܥܒܘܕܘܬܐ . ܐܝܟ ܗܘܕܘܦܠܘܢ ܕܟܠܐ ܥܘܣܒ̈ܪܬܐ ܐܣܟܠܛܘܢܝܬܐ ܗܘܕܘܦܠܘܢ ܥܠ ܚܕ ܡܢܝܢܐ ܕܓܘܪ̈ܐ ܡܢ ܐܟܠܘܬܐ ܥܘܣܒ̈ܪܬܐ ، ܡܬܚܙܝܐ ܒܢܩܒ̈ܢܐ ܚܕ̈ܐ ، ܘܡܬܡܝܢ ܐܟܠܐ ܥܘܣܒ̈ܪܬܐ ܗܘܝܐ ܡܬܥܒ̈ܕܢܐ ܒܝܕ̈ܐ ، ܐܝܟ ܕܗܘܐ ܗܕܝܟܐ ܐܥܒܘܕܘܬܐ ܕܝܠܗ . ܐܝܟܐ ܟܠ ܐܟܠܘܬܐ ܡܢ ܐܟܠܘܬܐ ܡܢܝܢܐ ، ܡܫܘܕܥܐ ܗ̇ܝ ܡܢ ܦܝܫܐ ܣܝܡܢܐ ، ܘܦܝܫܐ ܢܘܗܪܢܐ ܡܬܟܠܝܐ ، ܡܬܥܒܕ ܗܢܐ ܡܬܩܪܝܢܐ ܣܝܡܢܐ ܘܡܬܩܪܝܢܐ ܢܘܗܪܢܐ ، ܘܡܬܕܟܪܝܢ ܥܡ ܓܡܘܪܗ ܡܢ ܐܟܠܘܬܐ ܡܢܝܢܐ ، ܡܢ ܟܠܐ ܥܘܣܒ̈ܪܬܐ ܗܘܕ̈ܐ ܦܩܘܕܘܬܐ (Cross Striation) . ܘܡܬܦܠܓܬܐ ܕܡܬܥܒܕܢܐ ܐܠܗܘܕܘܬܐ ، ܦܬܟܐ ܚܘܪܐ ܕܦܝܫܐ ܣܝܡܢܐ ܘܦܝܫܐ ܢܘܗܪܢܐ ܡܫܘܕܥܐ ܗܢܐ ܡܢ ܠܓܘ ܦܘܪܢܣܐ ، ܡܢܝܗ ܕܡܢܐ ܘܦܝܫܐ ܗܢܐ ܡܬܥܒܕܢܐ ܕܓܘܐ ܕܠܗܘܢ ، ܒܫܘܝܘܬܐ ܠܦܘܪܢܣܐ ܕܠܗܘܢ ، ܗܘ ܕܟܠܝܐ ܠܗ ܕܘܟܬܗ ، ܘܡܢܝܗ ܣܝܡܢܐ . ܘܦܝܫܐ ܗܢܐ ܡܬܥܒܕܢܐ ܕܓܘܐ ܕܢܘܗܪܢ ، ܒܫܘܝܘܬܐ ܠܦܘܪܢܣܐ ܕܢܘܗܪܢ ، ܗܘ ܕܡܫܘܕܥ ܗܢܐ ܡܢܗ ܢܩܒܐ (٥ - ٢ ، ٩) .

ܗܘ ܟܠܐ ܐܒܝܫܐ ܠܗ ܦܝܫܐ ܣܝܡܢܐ ܘܦܝܫܐ ܠܗ ܢܘܗܪܢܐ . ܘܟܠܐ ܡܬܩܪܝܬܐ ܠܗ ܚܕ ܐܟܠܘܬܐ ، ܡܢ ܦܠܓܐ ܕܟܠܡܬܐ ܕܓܘܪܐ ܥܠ ܣܘܓܐܐ ܘܡܬܥܒܕܢܗ ، ܘܡܬܐ ܐܥܒܘܕܘܬܐ ܕܟܠܘܬܐ ، ܗܘ ܡܬܩܪܝܢܐ ܠܥܒܕܬܐ ܕܐܥܒܘܕܘܬܐ ܕܟܠܐ ܥܘܣܒ̈ܪܬܐ ، ܘܡܫܚܬܐ ܕܥܘܣܒܪܬܐ .



ܨܘܪܬܐ (٥ ـ ٢) ܐܘܪܚܐ ܕܐܪܒܐ ܠܘܡܒܪܬܐ

ܒܟܠܗ ܚܘܫܒܢܘܬܐ ܠܚܘܫܒܐ ܐܝܬܝܗ̇ ܠܡܦܩܢܘܬܐ ܘܡܬܚܫܚܢܘܬܗ̇ ܡܢ ܡܢܬܘܬܐ ܕܐܕܝܢܘܣܝܢ ܬܠܝܬܝ ܦܘܣܦܛܐ ATP . ܦܠܚ ܡܫܘܚܝܢ ܐܝܟ ܐܢܙܝܡܐ ܡܫܚܠܦ ܠܐܕܝܢܘܣܝܢ ܬܠܝܬܝ ܦܘܣܦܛܐ ܠܐܕܝܢܘܣܝܢ ܬܪܝܢ ܦܘܣܦܛܐ ADP ܘܡܦܠܛ ܚܘܫܒܐ ܐܝܟ ܕܗܘܐ ܚܘܝܠܐ :

ܡܫܘܚܝܢ

ATP ⟶ ADP + IP + ܚܘܫܒܐ

ܦܘܣܦܛܐ ܠܐ ܐܘܪܓܢܝܐ   ܐܕܝܢܘܣܝܢ ܬܠܝܬܝ ܦܘܣܦܛܐ   ܐܕܝܢܘܣܝܢ ܬܪܝܢ ܦܘܣܦܛܐ

ܘܡܬܚܫܚܝܢ ܚܕܡܐ ܐܝܟ ܐܢܘܢ ܥܠ ܦܘܠܚܢܘܬܐ ܕܡܦܩܢܘܬܐ ܚܘܫܒܢܘܬܐ ܐܝܟ ܐܢܘܢ ܕܟܠܗܘܢ ܘܐܢܘܢ ܕܡܬܝܕܥܝܢ.

٢ - ٣ - ܚܘܫܒܢܘܬܐ ܠܚܝܬܐ :

ܡܬܕܪܟ ܟܠܐ ܕܚܘܫܒܢܘܬܐ ܠܚܝܬܐ ܕܗܘܬܐ ܕܟܠܐ ، ܘܐܝܟ ܡܕܘܡܝܐ ܡܢܐ ܒܝܬܝܬܐ . ܠܘܬܗ ܠܐ ܙܒܢܐ ܘܫܬܝܢ ܡܦܩܢܘܬܐ . ܐܘܟܝܬ ܡܦܩܢܘܬܗ ܝܠܗ ܡܢܐ ܡܚܘܠܐ ܚܘܫܒܢܘܬܐ . ܘܡܢܪܒ ܠܚܘܫܒܢܘܬܐ ܕܠܘܚܫܒܢܘܬܐ ܒܘܬܗ ܡܬܕܪܟܬܐ . ܟܠܐ ܕܚܘܫܒܢܘܬܐ ܠܚܝܬܐ ܦܪܝܫܬܐ ܘܡܬܕܪܟܬܐ ܡܢܐ . ܘܡܬܚܙܐ ܝܠܗ ܚܘܫܒܢܘܬܐ ܒܝܬܝܬܐ ܡܫܚܠܦܐ . ܐܝܟ ܝܪܘܩܐ ܕܚܘܪܬܐ ܚܘܫܒܢܘܬܐ . ܝܠܗ ܡܙܓܐ ܕܟܠܝܗ ܚܘܫܒܢܘܬܐ (ܗܪܘܦܠܝܗ) . ܘܒܝܬܝܬ ܚܘܪܬܐ ܘܐܣܝܬܐ ܒܪܘܟܠܬܐ ܐܠܗ . ܐܝܟ ܙܘܦܪܐ ܒܝܬܝܬܐ ܦܪܫܠܘܗܝ ܡܢ ܣܪܛܐ .

٣ - ܙܘܥܐ ܝܠܗ ܒܪܘܢܝܬܐ :

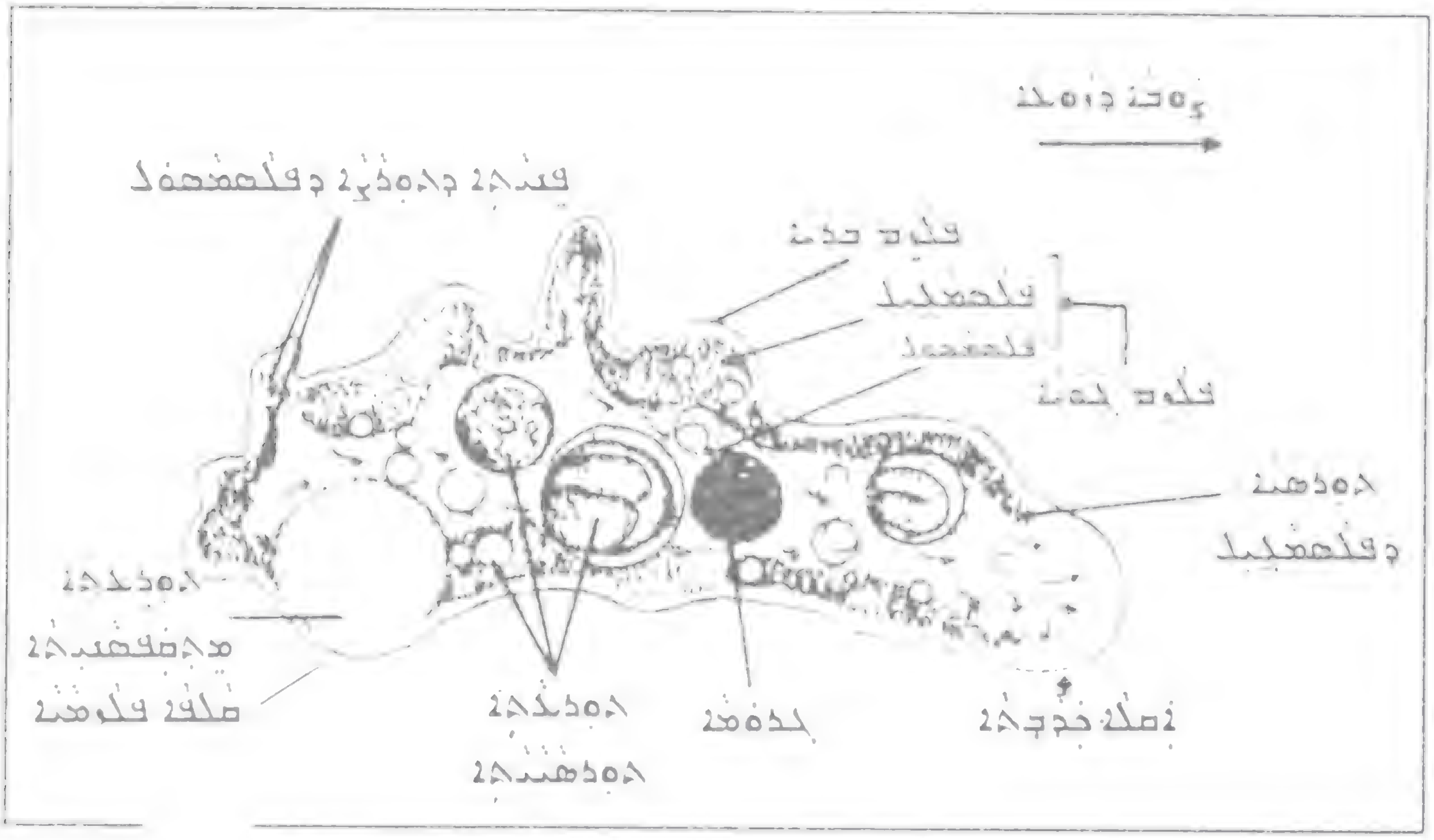
ܒܬܚܘܡܐ ܝܠܗ ܐܝܬܐ ܡܫܚܐ ܡܬܚܙܝܐ ܒܝܢ ٥،٠ ܠ ١،٥ ܡܝܟܪܘܡܝܛܪܐ ܘܡܫܚܐ ܐܪܝܟܘܬܐ ܕܐܪܒܥܐ ܡܝܠܐ ١٠٠ ܡܝܟܪܘܡܝܛܪܐ . ܘܗܘܝ ܒܐܪܒܥܐ ܡܫܚܠܦܐ . ܡܝܠܐ ܡܝܬܝܐ ܘܡܝܠܐ ܡܬܬܪܝܢܬܐ . ܘܟܠܐ ܡܝܠܐ ܦܪܝܫܝܬ ܙܘܦܪܘܢܬܐ . ܐܝܬܠܗܘܢ ܗܕܡܐ ܙܘܥܝܐ . ܘܝܠܗ ܕܟܠܐ ܙܘܥܐ . ܐܝܬ ܐܪܒܥܐ ܗܕܡܐ ܡܝܠܐ . ܐܝܬܠܗܘܢ ܫܘܦܐ ܡܫܬܝܠܘܗܝ . ܥܠ ܙܘܥܐ ܝܠܗ

ܥܘܒܐ ܚܒܝܫܐ. ܘܟܠܗ̇ ܗܘܝ ܡܠܘܐܐ ܐܝܟ ܕܝܠܗ ܐܡܝܢܘܬܐ ܟܟܝܡܝܐ ܕܚܘܠܘܕܐ ܘܦܫܝܛܘܬܐ ܕܗܝܟܠܗ.

٤ . ܙܢ̈ܝܐ ܠܘ ܚܕ̈ܢܝܐ :

٤ — ١ . ܐܡܝܒܐ :

ܙܢܐ ܐܡܝܒܐ ܡܬܦܫܛܐ ܕܐܝܬܘܗܝ ܚܕܢܝܐ. ܘܐܝܬܘܗܝ ܡܫܬܟܚܐ ܒܡ̈ܝܐ ܡܢ ܡܘܬܐ. ܟܠܗ̇ ܓܘܫܡܗ̇ ܗܘܐ ܡܢ ܚܠܡܐ ܕܚܘܬܐ (ܨܘܪܬܐ ٥ — ٣) ܘܐܝܬܘܗܝ ܚܕܢܝܐ ܕܝܠܗ ܩܒܠܐ ܕܙܘܥܐ. ܠܐ ܟܠܗܘܢ ܠܘ ܐܡܝܒܐ. ܐܠܐ ܠܘ ܡܘܬܐ ܡܬܚܫܚܢܝܐ ܘܡܘܬܐ ܐܡܝܒܝܐ. ܠܘ ܟܠܐ ܡܢ ܚܘܬܐ ܦܓܪܝܐ ܡܘܬܐ. ܐܝܟ ܐܣܘܛܐ ܘܦܪܝܫܐ ܚܝܠܢܘܬܐ. ܘܐܣܦܪܘܓܝܐ ܚܘܪܢܝܐ ܕܓܘܫܐ ܠܘ ܩܡܚܪܢܝܐ. ܘܦܪܝܫܐ ܗܢܐ ܐܣܟܡܐ ܘܠܘܩܒܠ ܕܐܝܬܘܗܝ ܚܕܢܝܐ ܒܡܘܪܟܒܐ ܕܝܕܥܐ. ܘܟܠܗ̇ ܗܘܝ ܚܕܢܝܐ ܚܠܝܡܢܝܐ ܠܠܘܚܝܐ ܚܪܢܝܐ. ܠܐ ܐܢܒܝܐ ܦܫܝܛܬܐ. ܘܐܝܬܘܗܝ ܠܘ ܚܕܡܢܐ ܐܝܟ ܡܫܪܫܬܐ.



ܨܘܪܬܐ (٥ — ٣) ܙܢ̈ܝܐ ܠܘ ܐܡܝܒܐ

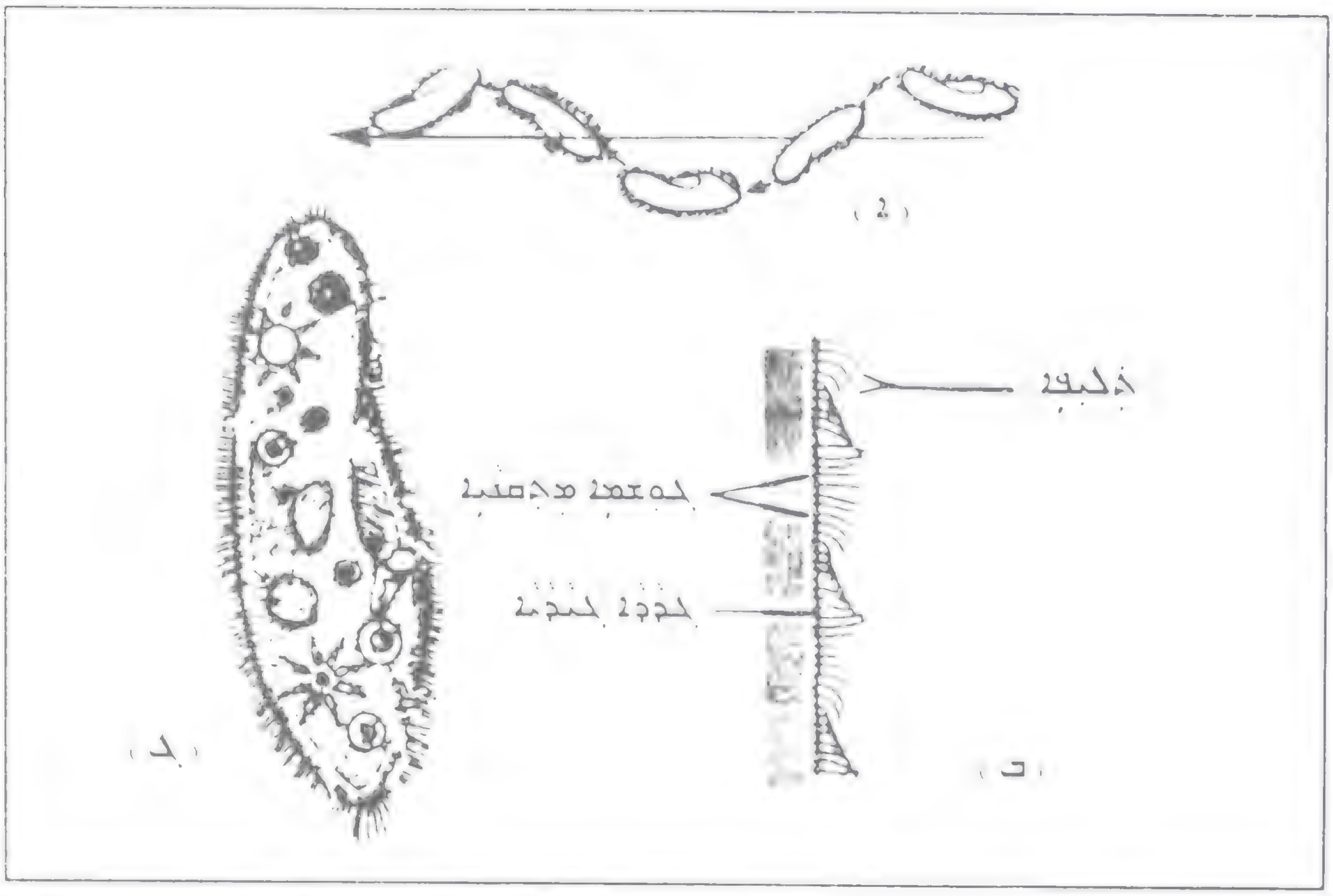
ܚܒܪܐ ܡܬܘܪܘܬܐ ܕܡܬܕܪܫܬܐ ܕܐܡܠܐ ܒܕܪܓܬܐ ܘܡܬܚܫܒܐ ܗܘ ܐܘ ܡܬܦܩܘܬܗ ، ܘܐܟܐ ܕܡܬܘܦܠܘܬ ܒܐܡܝܢܬܐ ܕܡܫܬܘܠܐ . ܘܠܗ ܚܕܐ ܐܡܠܐ ܒܕܪܓܐ ܡܬܚܫܒܐ ، ܒܕ ܚܘܫ ܡܬܘܦܠܘܬ ܡܢܕܪܘܢܝܐ ܥܣܠܐ (ܦܠܣܘܦܘܬ) ܪܒܝܐ ܠܗ ܚܕ ܐܢܘܟܐ ܡܢ ܡܬܘܦܠܘܬ ܒܪܝܐ ܦܪܕܝܢܝܐ ، ܒܝܢ ܚܕܐ ܟܢܝܫܘܬܐ (ܦܠܣܘܦܝܐ) ، ܘܟܪܝܟܝܐ ܐܘܐ ܒܓܪܗ ܒܡܬܘܦܠܘܬ ܙܦܬܐ (ܦܠܘܬ ܒܪܝܐ) ، ܦܬܐ ܡܪܝܡܬܐ ܐܡܠܐ ܒܕܪܓܐ ، ܐܝܢ ܥܪܬܐ ܕܡܘܪܬܐ ܐܡܝܢܬܐ ، ܚܕܐ ܡܠܦܐ ܦܠܘܣܝܐ ܚܠܝܡܐ ܡܢܘܢܝܬܐ . ܬܪܝܢ ܘܡܟܐ ܕܐܡܠܐ ܒܕܪܓܐ ، ܒܐܘܪܚܐ ܕܡܠܦܐ ܦܠܘܣܝܐ ، ܒܡܫܝܢܐ ܡܢ ܕܘܟܝܐ ، ܒܚܝܠܐ ܕܡܬܝܕܥܗ ܡܢ ܠܪܥܐ ܕܡܘܪܬܐ ܬܪܬܗ .

٤ — ٢ - ܦܪܨܘܦܘܬ :

ܦܪܨܘܦܘܬ ܝܠܗ ܡܢ ܐܢܫܐ ، ܘܐܢܫܐ ܡܪܡܝ ܠܡܘܬܐ ܒܪܘܟܒܗ ܐܢܫܐ ܦܪܝܫܐ ܝܢܐ ܒܪܟܘܬܐ ܕܡܝܢܝܗ ܘܟܪܘܬܗ ܦܣܩܘܬܐ ܒܡܘܬܐ . ܘܝܢ ܦܪܨܘܦܘܬ ܒܡܝܬܘܬܐ ܕܐܢܫܗ ܒܟܠ ܡܕܪܐ ܒܝܢ ܠܪܕܐ ܠܢܪܝܐ ܡܡܬܠܐ ܒܝܢ ܐܢܐ ܘܗܝ . ܘܡܠܝ ܠܪܕܐ ܠܢܪܝܐ ܟܠܝܗ ܒܟܘܡܬܐ ܡܘܪܒܐ ܕܠܘܒܬܐ ، ܘܡܝܬܘܬܐ ܕܐܗܐ ܘܗܝ ܕܐܢܫܐ . ܘܝܢܟ ܦܪܨܘܦܘܬ ܠܡܪܡܝܐ ܐܘ ܠܬܪܬܝܢ (ܗܦܟܐ ܕܘܗܝ ܕܐܢܫܐ) .

ܘܒܝܢ ܐܢܫܐ ܡܢܝ ܠܡܬܐ ܒܝܘܪܬܐ ܠܥܝܘܬܐ ، ܗܘ ܡܬܪܢܐ ܚܘܪܬܐ ܕܦܪܨܘܦܘܬ ܚܕܐ ܡܪܝܗ ܐܪܝܘܬܢܝܐ . ܘܗܪ ܒܗܘ ܒܪܢܐ ܐܝܟ ܠܡܪܡܝܐ ܒܡܬܝܠܐ ܐܘܦܣܝܐ (ܚܠܘܢܝܐ) ، ܡܢ ܦܠܓܐ ܕܟܒܘܕܘܬܐ ܕܐܢܫܐ ܕܐܝܬ ܠܗ ܕܗܠܝܘܐ . ܒܕ ܟܪܝ ، ܘܡܢܝܗ ، ܒܬܪ ܡܢ ܐܢܫܐ ܕܥܪܪܐ ܕܦܝܫܬܐ ܕܠܗܒܡܐ .

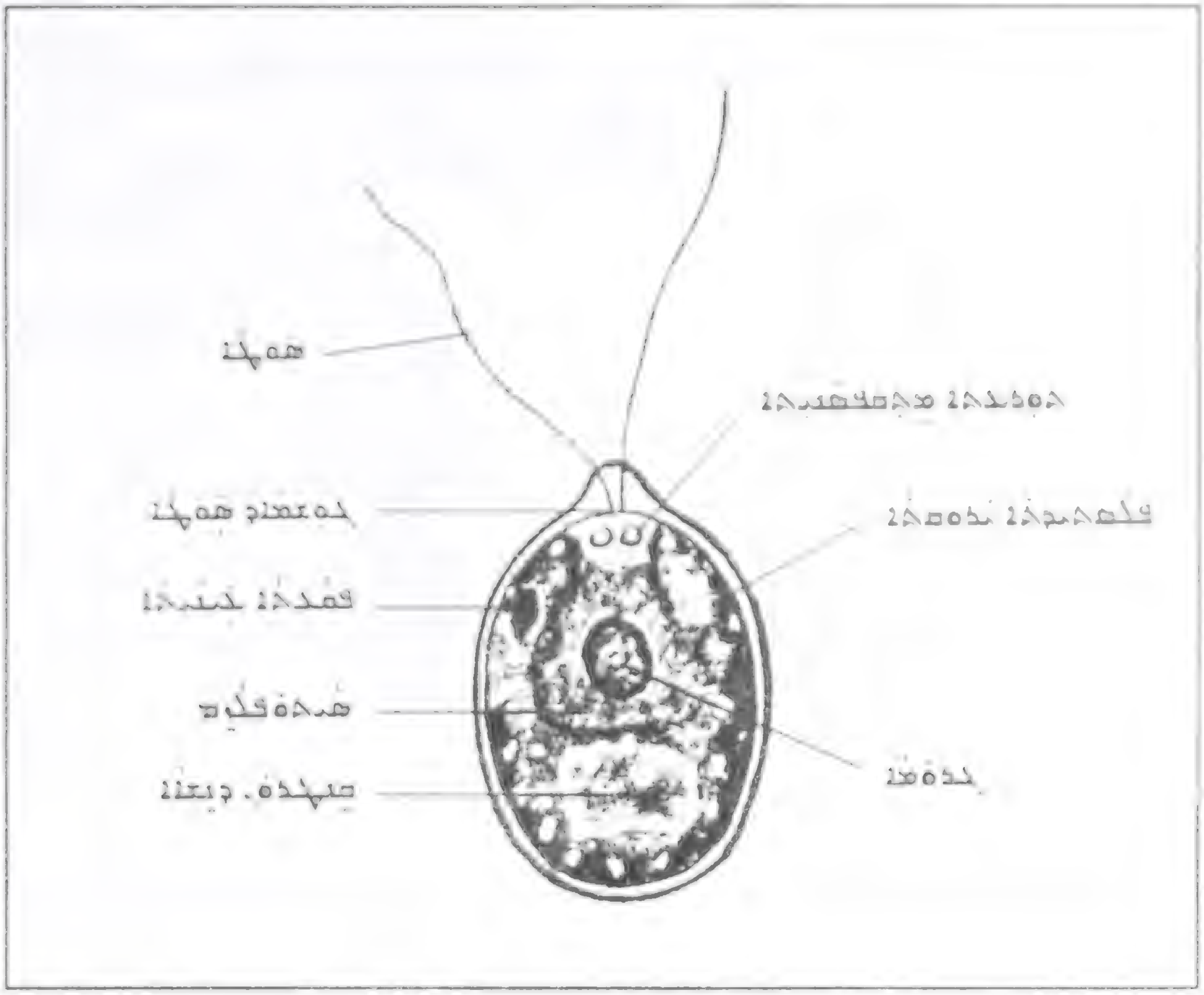
ܘܗܝ ܕܡܘܬܐ ܘܐܢܫܐ ܝܠܗ ܒܘܡܪܗ ܬܪܝܢ ܦܠܓܐ ܡܢ ܪܘܚܢܐ ܦܝܫܐ ܘܥܕܪܢܐ ܠܝܢܐ ܗܪܡܬܘܢܝܬܐ . ܒܕ ܡܘܒܝܠܗܘ ܢܘܦܩ ܕܦܥܠܗܘ ، ܥܠܝܐ ܒܢܝܗ ܐܢܫܐ ܘܡܘܬܐ ܒܝܬ ܦܥܠܐ ܕܚܘܬܝܗ ܡܬܡܢܝܬܐ ܥܠܝܡܬܐ ، ܐܝܟ ܒܡܪܕܥܝ ܒܡܫܚܬܐ ܠܚܕ ܡܬܢܐ . ܘܡܫܚܬܐ ܕܐܝܢ ܗܪܡܬܘܢܝܬܐ ܒܪܝܬܐ ܝܠܗ ܡܢ ܦܩܣܘܬܐ ܕܡܬܢܝܬܐ ܠܗ ܐܬܠܘܢܝܬܐ ܒܪܝܬܐ .



ܐܣܟܡܐ (٤ – ٥) ܐ . ܙܘܥܐ ܚܠܘܦܝܬܐ ܠܗ ܦܪܡܝܣܝܘܡ
ܒ . ܙܘܥܐ ܫܥܪ̈ܬܐ ܕܦܪܡܝܣܝܘܡ ܚܕ ܒܬܪ ܐܚܪܢܐ
ܓ . ܙܘܥܐ ܦܪܡܝܣܝܘܡ ܒܫܥܪ̈ܬܐ ܐܝܟ ܕܡܬܚܙܐ ܠܥܝܢܐ ܕܠܘܚܡܐ .

٤ – ٣ - ܙܘܥܐ ܠܗ ܚܣܝܕܐ :

ܚܣܝܕܐ ܐܝܬܘܗܝ ܚܝܘܬܐ ܦܫܝܛܬܐ ܡܢܗ ܚܙܝܢ ܒܡܝ̈ܐ . ܘܡܢܗ ܡ̈ܢܐ ܕܗܘܝܢ ܡܛܦܠܝܢ ܒܐܣܟܡܐ ܕܒܝܬܐ ܐܘ ܒܫܘܦܢܬܐ . ܘܫܟܝܚܝܢ ܠܩܠܘܪܘܦܝܠ . ܘܟܠ ܕܐܝܟ ܐܝܬ ܐܝܬܘܗܝ ܚܝܘܬܐ ܡܬܪܣܝܢܘܬܐ . ܚܕܟܡܐ ܡܢܗ ܡܢܗܝܢ ܕܙܥܝܢ ܠܗ ܡܛܠܬܐ ܚܝܘܬܐ . ܐܝܟ ܦܪܡܝܣܝܘܡ . ܘܗܘ ܐܝܬܘܗܝ ܚܣܝܕܐ ܢܦܫܐ ܚܕܝܢ ܒܡܝ̈ܐ . ܡܛܠܬܐ ܒܗܕܐ ܗܘܕܐ ܒܡܫܬܡܫܝܢ ܡܫܬܟܚܝܢ ܥܠ ܙܘܥܐ . ܒܪ ܡܢܐ ܒܝܬܗ ܡܢܐ ܘܚܕܐ ܚܕܐ ܗܕܝܢ . ܘܙܘܥܐ ܒܘܥܐ ܐܘܩܡܬܐ . ܘܟܠ ܡܢ ܐܝܬ ܗܕܐ ܗܘܕܐ ܐܫܬܕܝ ܥܠܘܗܝ ܒܡܕܡܝܢ ܒܝܬ ܠܘܚܡܐ ܕܥܠܬܐ ܦܝܫܐ ܥܠܗ ܡܣܛܝܓܘܣܘܡ ܗܘܕܐ (Mastigosome) . ܡܚܝܕܐ ܠܘܩܒܗ . ܘܠܘܩܒܠ ܕܐܝܬ ܗܕܐ ܠܘܚܡܐ ܐܝܬ ܦܫܝܛܬܐ ܚܕܢܝܬܐ (Stigma) ܕܠܘܚܡܝܬܐ ܠܚܙܘܐ . ܡܛܠܬܐ ܠܚܣܝܕܐ ܠܡܣܒܬܐ ܙܘܥܐ ܒܢܘܗܪܐ ܚܝܘܬܐ ܠܒܢ̈ܝܐ ܒܢܘܗܪܐ (ܐܣܟܡܐ ٥ – ٥) .



ܨܘܪܬܐ (٥ – ٥) ܚܝܘܬܐ ܕܐܘܓܠܝܢܐ

٤ – ٣ – ١ – ܣܘܛܠܝܬܐ :

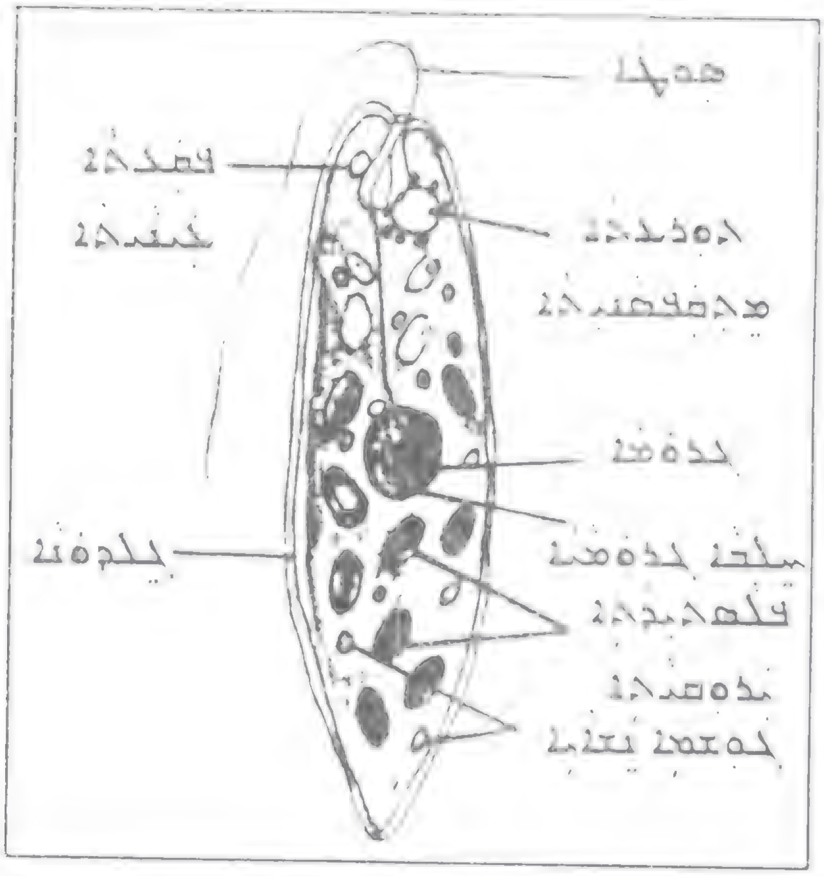
ܡܬܬܘܫ ܫܘܛܐ ܣܓܝܠܐ ܕܘܡܝܐ ܠܗ ܣܘܛܠܝܬܐ . ܘܗܘ ܐܝܬܘ ܢܘܪܐ ܠܓܪܡܐ ܡܬܝܠܕܐ ܡܢ ܒܘܪܟܐ . ܐܝܟܐ ܦܪܝܫܐ ܐܝܬܘ ܡܢ ܐܬܪܐ ܓܪܓܐ ܒܘܫܡܗ ܒܝܬ ܦܬܝܚ ܡܡܘܢܝܬܐ . ܘܡܬܚܙܐ ܕܘܟܐ ، ܘܡܣܘܓܝܢܐ ܐܝܬܘ ܫܘܛܐ ܣܓܝܠܐ ܕܘܡܝܐ ܫܘܡܐ ܠܚܕ ܡܬܘܪܓܢܐ ܠܗ ܡܙܠܐ ܡܢܐ (ܨܘܪܬܐ ٥ – ٦) .

ܒܪܐ ܫܘܛܐ ܡܢ ܦܪܕܬܐ ܡܬܡܢܝܬܐ . ܢܦܠܐ ܠܗ ܦܠܘܡܐ ܒܪܝܐ . ܘܦܪܕܬܐ ܡܬܡܢܝܬܐ ܨܦܝܪܬܐ ܐܝܬܝܗ̇ ܐܘ ܒܝܬܢܝܬܐ ، ܘܗܘ ܡܬܡܢܝܬܐ ܐܝܬܝܗ̇ ܠܡܨܝܥܝܘܬܐ (Centriole) ، ܟܕ ܗ̄ܝ ܡܬܘܪܓܬܐ ܐܝܬܝܗ̇ ܡܢ ܬܪܬܝܢ ܕܟܠܘܢܝܬܐ ܒܘܟܢܝܬܐ . ܐܝܟܐ ܫܘܡܐ ܝܕܝܐ ܡܢ ܫܘܛܐ ، ܒܪܝܟܐ ܐܝܬܘ ܒܣܠܟܐ ܦܠܘܡܐ . ܘܡܬܬܘܫ ܠܗ ܣܠܟܐ ܬܪܬܝܢ ܕܟܠܘܢܝܬܐ ܒܘܟܢܝܬܐ ܘܠܝܢܝܬܐ ܘܬܪܬܝܢ ܕܟܠܘܢܝܬܐ ܡܨܥܝܬܢܝܬܐ . ܐܝܟ ܫܘܛܐ ܕܘܡܝܐ ܠܠܠܟܬܐ . ܟܕ ܡܬܬܪܐ ܡܦܫܘܩܐ ܠܗ ܡܬܡܢܝܐ . ܘܡܬܝܐ ܙܘܓ ܚܕܐ ܥܠ ܡܬܡܫܚܐ ܕܫܪܝܐ ܕܫܘܛܐ

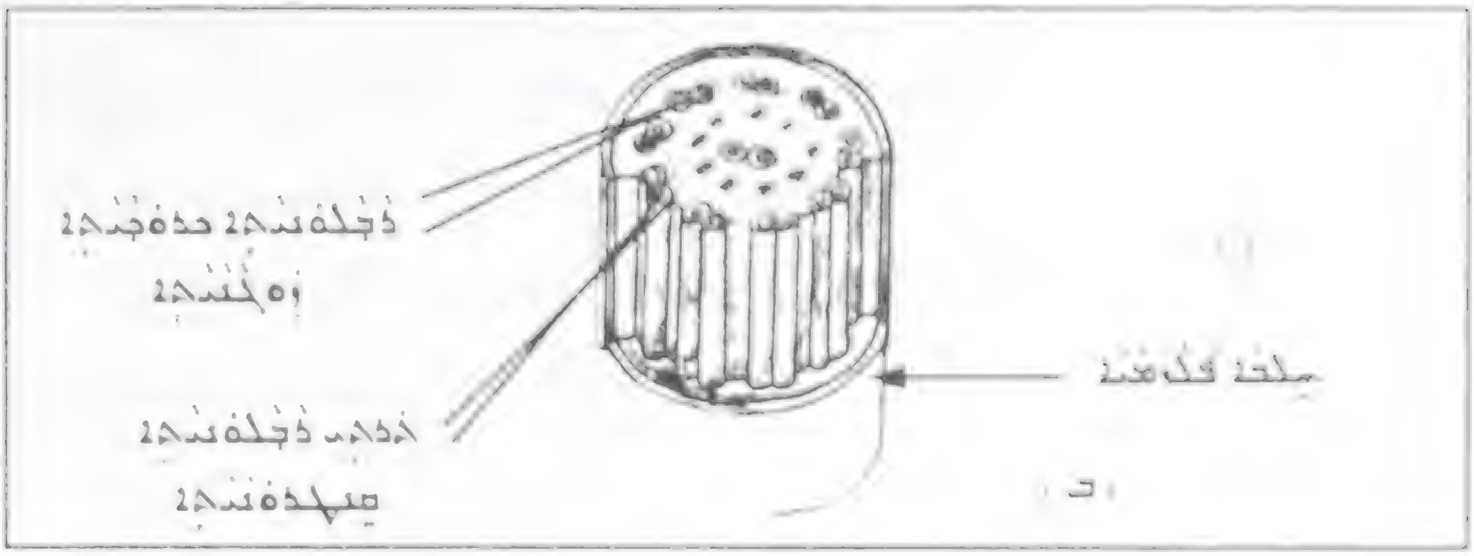
ܘܐܦ ܒܗ ܡܬܚܫܒܝܢ ܐܠܦܐ ܕܟܝܒܐ ܕܡܥܠܝܢ ܠܐܢܫܐ ܚܘܪܢܐ . ܡܣܬܟܠ ܐܝܟ ܗܘܐ ܙܢܐ ܠܡܪܥܐ ܒܣܠܐ . ܘܡܕܥܢܐ ܦܠܣ ܗܘܝܐ ܐܝܟ ܙܢܐ ܐܚܪܢܐ ܕܒܙܘܥܐ ܕܡܬܚܫܒ ܠܗ ܡܣܝܢܐ ܕܗܘܝܐ ܠܡܪܥܐ ܐܘ ܠܡܚܒܠܐ ܐܘ ܠܕܘܪܐ . ܘܒܠܚܘܕ ܡܛܝܒ ܙܢܐ ܕܠܗܘܢܐ ܠܗܘܠܦܐ ܙܢܐ ܕܙܘܥܐ .

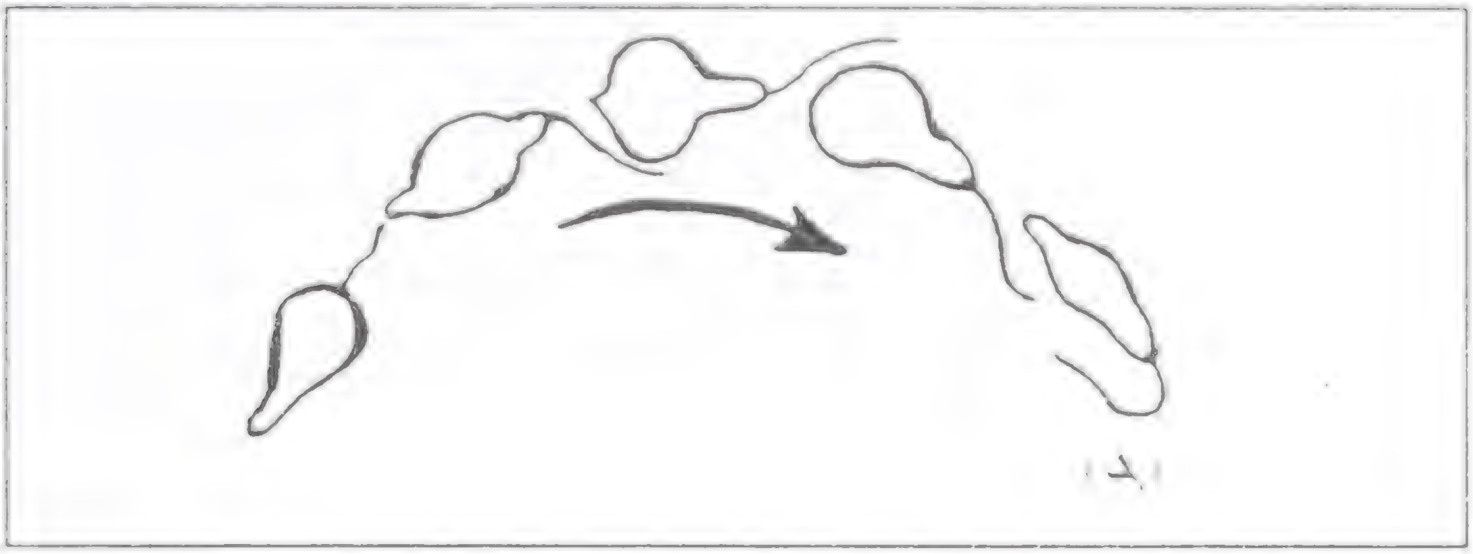
ܙܢܐ ܐܘܓܠܝܢܐ :

ܡܣܬܟܠܢܐ ܠܗܘܐ ܦܬܐ ܚܕܐ ܐܘܓܠܝܢܐ . ܗܘ ܙܢܐ ܙܢܐ ܦܪܝܫܐ ܐܠܗ ܡܬܚܫܒܐ ܙܢܐ ܐܘܓܠܝܢܐ . ܗܘ ܒܠܗ ܙܢܐ ܦܠܝܓܐ ܡܢ ܡܫܡܫܢܘܬܐ ܕܠܗܘܢܐ ܘܡܬܚܫܒܗ ܒܡܦܩܬܗ ܒܟܠܗ ܕܒܪܘܢܘܬܐ ܕܡܢܐ ܠܗ ܡܪܥܐ ܕܫܪܐ ܠܗܘ (ܨܘܪܬܐ ٥ — ٦ ܒ) .



ܨܘܪܬܐ (٥ — ٦ ܐ) ܐܘܓܠܝܢܐ





ܐܣܟܡܐ (٥ — ٦ ܒ) ܡܩܛܥܬܐ ܦܬܝܘܬܢܐ ܡܢ ܚܘܛܐ ܦܝܟܐ ܢܩܒܠܐ
ܡܢܗ ܫܘܪܐ ܡܢ ܚܠܬܐ ܦܠܘܬܐ .
ܐܣܟܡܐ (٥ — ٦ ܓ) ܙܘܥܐ ܡܫܚܠܢܐ .

٥ . ܙܘܥܐ ܠܘ ܢܩܝܢܐ :

ܙܘܥܐ ܕܢܩܝܢܐ ܐܝܬܝܗ̇ ܗ̇ܘ ܕܒܗ̇ ܒܪܝܬܐ ܕܐܡܟܬܐ ܕܐܬܢܐ ܢܩܝܢܝܬܐ ܘܡܬܚܫܚ . ܘܐܝܟܢܐ ܢܩܝܢܐ ܕܠܝܬܘܬܐ ܕܙܘܝܬܘܬܐ ܘܗܘܦܟ ܒܚܠܦ ܐܢܫ ܚܝܘܬܐ . ܐܝܟܐ ܗ̇ܝ ܕܟܠܗ̇ ܕܡܠܟܬܐ ܢܩܫܐ . ܠܐ ܐܝܬܘܗܝ ܡܬܝܕܥܢܐ ܠܟܠܢܐ ܒܪ̈ܢܫܐ ܚܝ̈ܘܬܐ . ܘܡܬܝܕܥܢܐ ܐܝܬܘܗܝ ܚܝܘܬܐ ܕܙܘܥܐ ܕܢܩܝܢܐ ܒܐܘܪܚܐ ܕܙܘܥܐ ܦܬܘܟܬܐ ܡܬܚܠܦܬܐ ܡܬܬܘܓܢܝܬܐ . ܘܡܬܚܙܐ ܒܠܚܘܕ ܒܡܝܢܐ ܕܢܩܝܢܐ ܠܘܩܒܠ ܡܫܬܘܕܥܢܐ . ܐܝܟܐ ܕܦܬܝܪܐ ܗ̇ܝ ܒܡܬܢܝܢܝܬܗ ܡܢ ܓܢܒܐ ܕܗܘܕܝܬܐ ܘܙܘܥܐ ܕܙܘܥܐ ܘܐܘܪܓܝܘܬܐ ܗ̇ܝ ܕܡܬܪܬܐ ܙܘܥܐ .

٥ — ١ - ܐܕܫܐ ܕܥܣܒ̈ܐ ܠܐ ܡܫܒܚ̈ܬܐ :

٥ — ١ — ١ - ܥܣܒܐ ܕܘܪܕܝ̈ܐ ܕܡܠܝܬܐ :

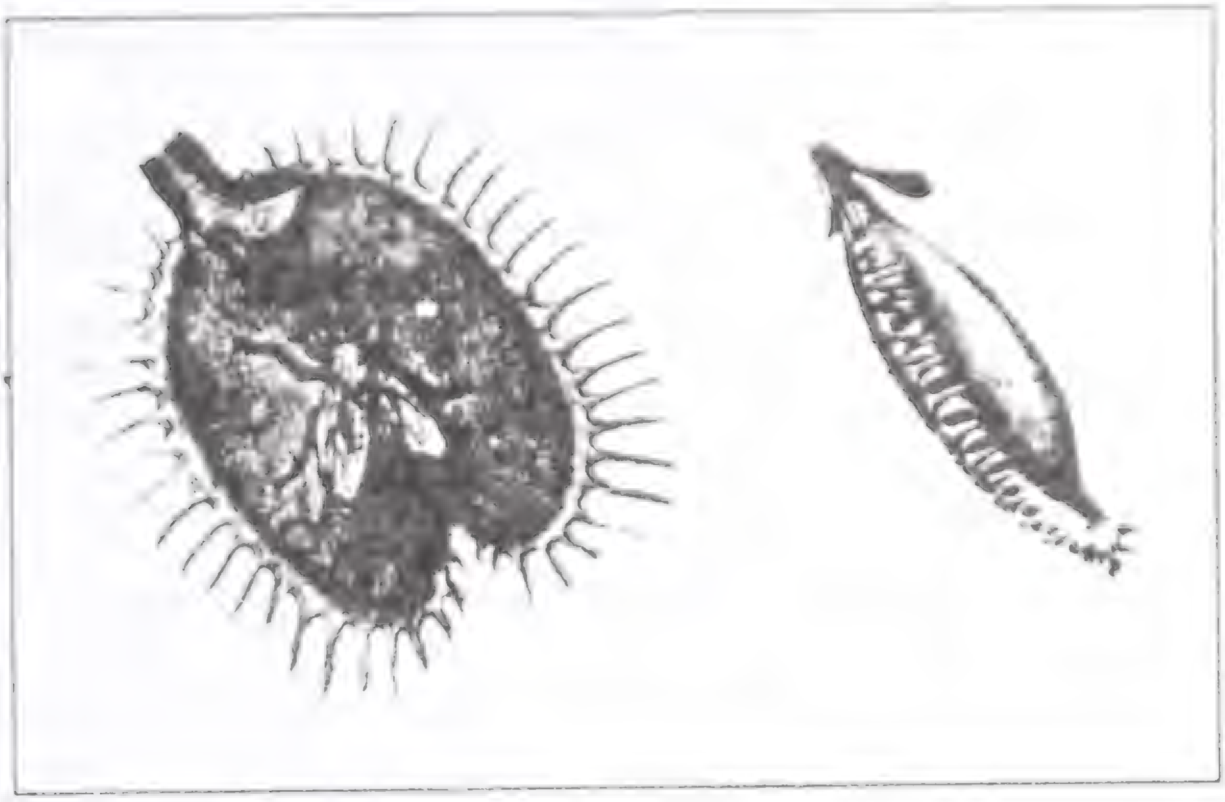
ܒܠܚܘܕ ܥܣܒܐ ܡܠܘܝܐ . ܗܢܘܢ ܐܝܟ ܗܘܦܝ ܢܗܠܐ ܥܠ ܡܝܘܪܐ ܦܪܝܫܐ ܐܝܟ (ܟܫܘܬܐ) ܐܝܟ ܕܡܬܚܙܝܐ ܒܨܘܪܬܐ ܕܣܝܡܐ ܒܨܚܚܐ (٥ — ٧) . ܘܡܫܒܚܬܐ ܢܫܦܬܐ (ܡܫܡܘܫܐ) ܐܣܛܡܐ (٥ — ٨) . ܐܘ ܡܫܟܚܝܢ ܢܘܬܐ ܕܪܝܫܬܐ ܕܫܚܡܐ . ܐܝܟ ܕܥܣܒܐ ܕܡܬܩܪܝܢ ܘܗܘܡܐ . ܕܩܠܝܢ ܣܘܝܐ ܠܗ ܡܫܒܚܬܐ ܢܫܦܬܐ . ܘܣܕܝܡܐ ܒܡܠܝܬܐ . ܐܦ ܐܕܫܐ ܡܢ ܥܣܒܐ ܗܢܐ ܒܟܠܝܬܐ ܕܒܘܣܠܦܐ ܒܘܪܕܝ̈ܐ ܕܡܠܝܬܐ ܕܒܘܪܟܬܐ ܕܠܝܬ ܡܫܒܚܬܐ . ܗܢܐ ܡܢ ܒܘܣܠܦܐ ܒܘܦܪܐ ܕܣܠܩܝܢ ܕܒܘܪܟܬܐ . ܐܝܟ ܗܘܦܝ ܢܗܠܐ ܠܡܝܘܪܐ ܡܘܕܝܢܐ ܠܟܠ ܐܢܫܐ ܥܣܒܐ ܗܘܐ ܡܠܘܝܐ . ܘܗܢܐ ܒܣܕܡܐ ܕܦܦܐ . ܘܒܠܚܘܕ ܥܣܒܐ ܗܦܟܐ ܒܗܘܦܠܐ ܕܒܝܪܢܐ ܕܫܚܡܐ ܕܘܡܐ . ܗܕܡܐ ܕܡܫܒܚܬܐ ܕܝܢ ܒܡܠܘܐܬܐ . ܠܐܣܛܢܘܬܐ ܕܝܗܘܐ ܥܠܘ ܡܢܗ ܠܗܘܪܐ .

ܘܡܝܬܪܘܬܐ ܗܠܘ ܦܠܚܘܬܐ ܕܥܣܒܐ ܕܘܪܕܝ̈ܐ ܕܡܠܝܬܐ ܠܦܘܡ ܐܕܫܐ ܕܘܡܝܐ ܠܗ :

ܐ - ܥܣܒܐ ܕܨܝܕܬܐ :

ܘܒܠܚܘܕ ܥܣܒܐ ܕܗܢܘܢ ܒܝܘܪܩܬܐ ܕܫܡܫܐ ܠܗ ܝܕܥܝܢ ܘܡܢܘܬܐ ܗܦܝܟܬܐ . ܘܗܢܘܢ ܡܢ ܥܣܒܐ ܕܨܝܕܬܐ . ܘܡܫܒܚܬܐ ܢܫܦܬܐ ܕܣܝܡܐ ܡܗܘܝܢܠܘܗ . ܠܢܫܦܬܐ ܕܣܝܡܐ ܘܚܘܪܐ . ܦܪܝܠܘܗ ܒܚܘܪܬܐ ܕܒܠܬܢܐ . ܘܡܢ ܐܝܟ ܢܫܒܬܐ ܡܫܒܚܬܐ ܕܡܘܬܐ (Dionaea) ܘܕܪܘܣܝܪܐ (Drosera) . ܗܢܘܢ ܢܗܡܢܐ ܐܦ ܡܫܒܚܬܐ ܒܡܕܝܢܐ ܕܐܡܪܝܩܐ . ܘܡܬܩܘܕܝܐ ܡܢ ܝܕܥܐ ܕܐܝܟ ܡܫܒܚܬܐ ܡܢ ܢܘܠܐ ܥܗܝܢܐ ܘܗܢܐ ܠܗܠܦܢܐ . ܒܐܣܛܢܘܬܐ ܕܙܦܢܬܐ ܦܠܚܬܐ ܠܗܢܝ ܝܒܫܐ ܥܠ ܡܕܘܢܫ ܗܢܝܢ ܒܗܘܐ ܣܠܩܐ . ܘܥܠ ܦܪܐ ܝܠܕܬܐ ܠܟܠ ܝܒܫܐ ܒܗܘܐ ܙܘܥܐ ܘܣܕܡܐ . ܘܡܕܝܢܐ ܡܢ ܒܝܫ ܗܕܡܬܐ ܕܟܐ . ܡܕܡܟ ܡܠܘܐܐ ܡܦܪܕܝܢ . ܘܐܝܟ ܕܝܒܫܐ ܣܕܐ ܕܫܚܡܐ ܠܐܝܟ ܒܗܘܐ ܡܝܘܝܢܐ ܕܝܕܥܐ . ܗܢܝ ܝܒܫܐ ܕܝܕܥܐ ܕܒܡܟ ܥܠܘ ܘܡܣܕܡܟ ܒܗܘܐ (ܨܘܪܬܐ ٥ — ٧) . ܘܗܘܢ ܝܕܥܐ ܡܕܡܟ ܗܕܡܐ ܝܘܪܩܐ ܫܡܘܙܐ ܕܒܘܡܐ . ܘܗܢܐ

ܡܢܝܢܐ ܕܨܘܪܬܐ ܚܕ (٩ — ٣٥) ܗܘܝܐ ܦܐܪܐ ܗܕܐ ܓܒܝܢܐ ܕܓܪܒܐ. ܒܥܡܢܐ ܠܡܠܦܐ ܡܢ ܒܢܝܐ ܕܐܪܥܐ ܓܠܝܘܬ.



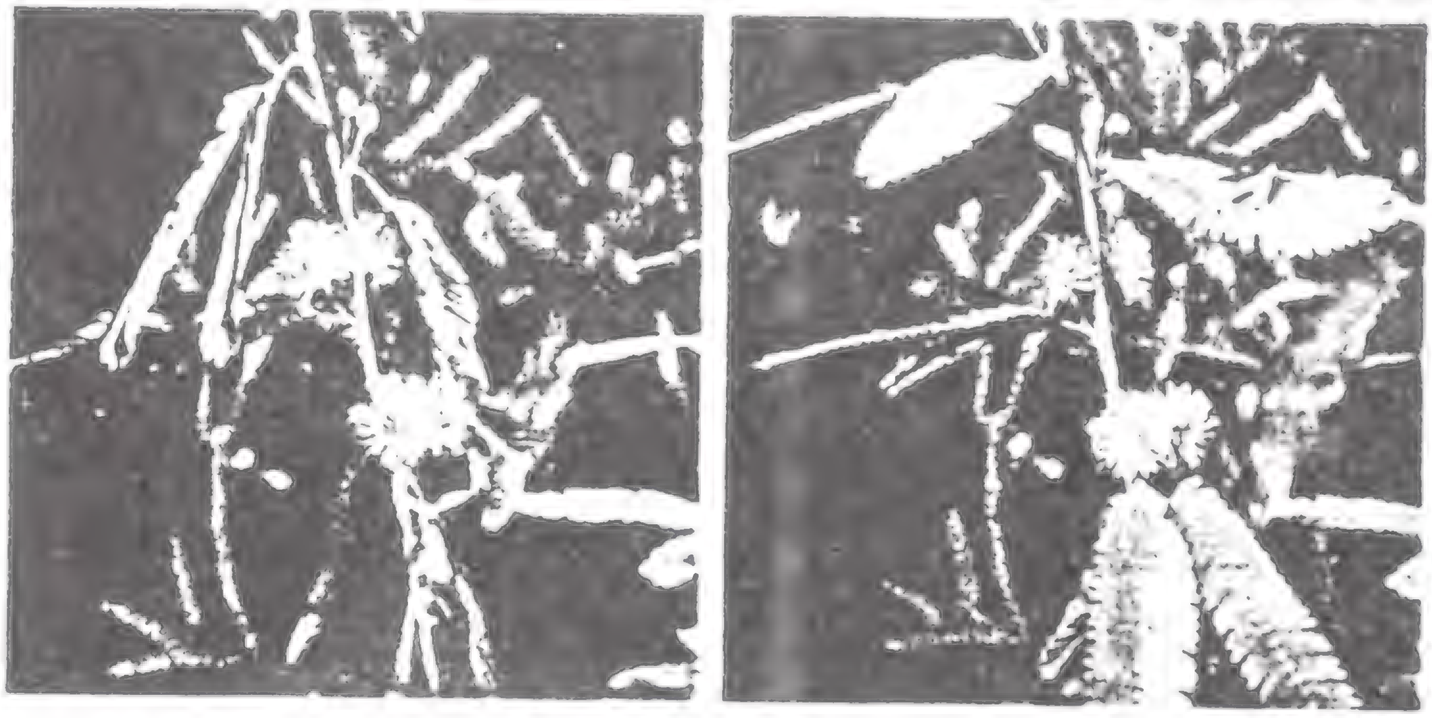
ܨܘܪܬܐ (٥ — ٧) ܢܨܒܬܐ ܢܣܒܪܬܢܝܬܐ ܕܕܒܒܐ

ܐܝܬ ܐ. ܒܪܐܠܗ̇ ܘܗܢܕܘܪܬܐ ܒܡܫܟܚܘܬܐ ܕܡܝܬܪܬܐ ܐܘ ܒܠ ܠܗܘܡܢܐ ܕܗܘܐ ܕܠܐ ܠܗ ܡܢܝܢܬܐ ܦܪܕܬܗ. ܕܒܡܬܐ ܕܗܕܐ ܓܒܝܢܐ ܠܐ ܢܕܒܐ ܢܗܪ ܡܢ ܗܕܐ ܢܘܡܐ. ܘܦܝܠܗ ܡܫܘܕܪܬܐ ܐܝܬܘܬܐ ܕܐܘܝܡܐ ܥܕܢܬܐ ܠܦܪܘܬܢܝܬܐ ܠܗ ܕܐܗܐ ܚܕܪܬܐ. ܒܪ ܡܘܗܪܝܘܬܐ ܕܓܪܒܐ ܒܡܫܟܚܘܬܐ ܕܚܪ ܡܛܠܬܐ ܡܢ ܒܝܬܐ. ܐܘ ܣܘܪܐ (ܘܠܠܐ) ܕܒܝܬܐ. ܡܥܕܢܐ ܦܪܕܬܐ ܕܐܗܐ ܡܛܠܬܐ ܒܠܚܘܕܗ ܘܠܐ ܦܝܫ ܡܝܬܐ ܡܢܕܝ. ܐܝܬܐ ܠܗ ܢܨܒܬܐ ܕܡܫܘܫܐ. ܓܪܒܐ ܕܐܗܐ ܢܨܒܬܐ ܚܝܝܠܐ ܐ ܕܝܪܠܗ ܠܓܪܦܬܐ ܡܢ ܓܪܦܗ. ܘܡܥܕܢܐ ܐܗܐ ܡܥܒܕܢܘܬܐ ܠܚܠܝܨ ܓܪܒܐ ܕܐܗܐ ܢܨܒܬܐ (ܨܘܪܬܐ ٥ — ٨).

ܐܝܬܐ ܕܐܒܘܬܐ ܒܥܘܢܐ ܕܘܡܬܐ ܘܡܥܒܕܢܘܬܗ ܒܠ ܒܘܣܠܦܐ ܕܘܪܒܐ ܕܡܠܬܐ ܕܒܘܪܬܐ. ܡܥܕܢܢܬܐ ܠܒܐ ܘܡܚܐ. ܒܪ ܦܬܚ ܕܪܒܬܐ ܒܡܝܢܕܝ ܡܢ ܪܒܘܬܐ. ܠܗ ܡܠܘܐܐ ܕܪܓܠܐ ܠܗ ܢܨܒܬܐ ܒܦܫܘܫܐ ܒܥܒܕܢܐ ܡܢ ܕܐܗܐ ܡܬܒܐ.

ܒ. ܙܘܥܐ ܕܢܘܡܐ ܘܥܝܪܘܬܐ :

ܗܕܐ ܐܦ ܗܝ ܙܘܥܐ ܡܢ ܡܫܚܠܦܘܬܐ ܕܢܘܗܪܐ ܘܚܫܘܟܐ . ܘܡܬܚܙܝܐ ܠܗ ܒܪܘܡܐ ܕܢܝܢܐ ܕܠܝܠܝܐ . ܘܐܦ ܠܗ ܢܢܝܢܐ ܕܦܪܦܚܐ (ܡܝܡܘܙܐ) . ܘܒܝܘܡܐ ܕܘܚܝ ܛܪܦܐ (ܐܬܥܢܝܘܬܐ ܕܥܝܪܘܬܐ) ܘܡܬܟܢܫܝܢ ܒܠܠܝܐ (ܐܬܥܢܝܘܬܐ ܕܢܘܡܐ) . ܘܗܟܢܐ ܐܦ ܙܘܥܐ ܠܢܘܣܝܘܬܐ ܕܫܘܒܐ ܕܠܠܝܐ . ܠܗ ܡܫܡܢܐ ܕܛܪܦܐ ܘܛܪܦܘܢܐ . ܘܡܬܦܫܛ ܛܪܦܐ . ܘܒܟܪܝܢܐ ܕܪܫܬܐ ܕܢܘܣܝܘܬܐ . ܛܪܦܘܢܐ ܡܬܟܢܫܝܢ ܘܟܦܝܢ . ܘܙܘܥܐ ܕܥܝܪܘܬܐ ܘܢܘܡܐ ܡܬܡܫܚܐ ܗܢܐ ܕܗܕܐ ܒܟܪܝܢܐ ܕܢܘܗܪܐ . ܐܝܟܐ ܐܝܟ ܗܕܐ ܒܝܘܡܬܐ ܙܒܢܢܝܐ .



(ܒ)　　(ܐ)

ܨܘܪܬܐ (٨ — ٥) ܢܨܒܬܐ ܕܡܝܡܘܙܐ

٥ — ١ — ٢ - ܙܘܥܐ ܡܬܛܠܢܘܬܢܝܐ :

ܡܣܝܟܝܢ ܘܡܫܟܚܝܢ ܐܢܫܬܐ ܠܢܨܒܘܬܐ ܒܪܝܬܐ . ܡܥܘܣܠܦܐ ܒܢܨܒܘܬܐ ܒܪܝܬܐ ܦܝܫܐ ܡܥܘܡܪܐ ܡܘܗܪܢܐ ، ܐܝܠܐ ܦܝܫܐ ܠܗ ܡܥܘܡܪܐ ܒܥܘܣܠܦܐ ܒܪܝܬܐ ܠܗ ܐܢܫܬܐ ܘܦܠܛܠܐ ܡܢ ܗܘ ܡܘܗܪܢܐ ܡܢܝܢܬܐ . ܘܦܠܚܐ ܥܡܠܐ ܐܗܐ ܡܢܝܢܬܐ ܕܟܐ ܐܫܟܡܐ ، ܘܕܟܐ ܠܗܐ ܗܘܢܐ ܒܐܬܝܢܘܬܐ ܕܙܘܥܐ . ܘܐܝܟ ܕܗܘܐ ܙܘܥܐ ܕܙܘܥܐ ܙܘܟ ܡܘܗܪܢܐ ، ܗܘܢܐ ܡܢܝܢܬܐ ܡܬܛܠܢܘܬܢܝܬܐ ܡܫܟܢܝܬܐ (Positive tropism) . ܐܝܠܐ ܐܝ ܗܘܐ ܙܘܥܐ ܕܫܡܐ ܡܢ ܡܘܗܪܢܐ . ܗܘܢܐ ܡܢܝܢܬܐ ܡܬܛܠܢܘܬܐ ܡܪܫܟܢܝܬܐ (Negative tropism) . ܐܝܟ ܡܬܛܠܢܘܬܐ ܒܗܪܡܬܐ (ܙܘܟ ܒܗܪܐ) ، ܡܬܛܠܢܘܬܐ ܐܪܥܢܬܐ (ܒܙܘܟ ܢܬܘܦܘܬܐ ܐܪܥܢܬܐ) ، ܘܡܬܛܠܢܘܬܐ ܒܡܫܚܬܐ (ܒܙܘܟ ܡܘܗܪܢܐ ܒܡܫܢܐ ܘܥܪܒܘܟ ܡܢ ܡܬܛܠܢܘܬܐ) .

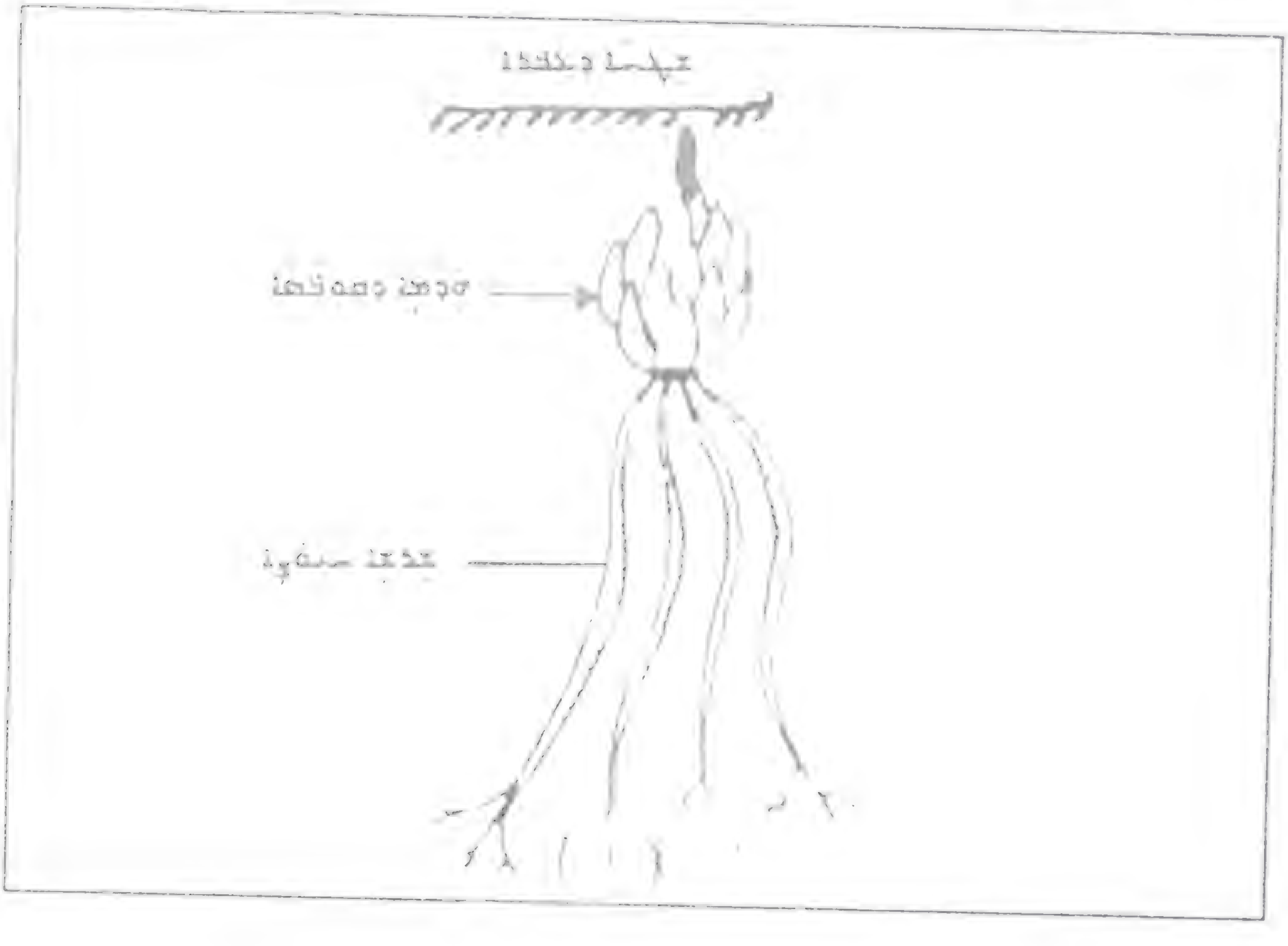
ܘܦܠܚܝܢ ܙܘܥܐ ܕܡܬܛܠܢܘܬܐ ܠܪܒܝܬܐ ܠܐ ܡܬܒܥܝܬܐ ܠܚܘܪܬܐ ܢܦܠܐ ܠܗ ܦܝܪܐ ܕܪܒܝܬܐ ܥܠ ܫܡܫܘܬܐ ܕܡܝܢܐ ܡܢ ܡܠܒܫܬܪܐ ܡܢ ܪܒܐ ܥܘܒܕܐ . ܒܕܒܠܐܝܬ ܕܪܒܐ ܒܢܬܗ ܪܠܟܝܢ ܒܡܘܗܪܢܐ ܒܪܝܬܐ ܐܝܟ ܒܗܪܐ ܐܘ ܢܬܘܦܘܬܐ ܐܪܥܢܬܐ ܐܘ ܟܠ ܡܘܗܪܢܐ ܐܚܪܢܐ . ܘܦܠܚܐ ܐܗܐ ܦܘܪܫܐ ܒܪܒܝܬܐ ܠܗܘܪܡܘܢܐ ܢܝܫܬܢܐ ܡܥܘܡܪܐ ܒܐܘܟܫܝܢܐ ، ܐܝܟ ܕܡܬܛܠܝܢ ܘܒܢ ܪܒܝܚ ܠܡܬܛܠܢܘܬܐ ܒܙܘܪܬܐ ܒܝܕ ܐܪܒܝܬܐ . ܠܗ ܡܠܘܐܐ ܕܬܘܒܬܐ ܗܘܪܡܘܢܐ ܒܢܫܬܐ ܒܦܫܘܛܐ ܥܒܝܕܐ .

٥ — ١ — ٣ - ܙܘܥܐ ܣܢܝܩܐ :

ܡܬܝܒܝܢ ܐܝܟ ܙܘܥܐ ܢܘܒܪܐܝܬ ܠܗ ܦܠܚܐ ܕܢܫܬܐ ܫܠܡܬܐ . ܘܐܦ ܠܗ ܥܪܥܐ ܕܒܙܠܐ ܘܒܘܪܟܬܐ . ܘܟܠ ܦܠܚܐ ܡܪܡܐ ܠܫܘܛܐ ܒܡܬܛܠܢܘܬܐ ܕܬܘܪܙܗ . ܘܦܪܝܫܐ ܠܗ ܒܪܛܒܬܢܘܬܗ . ܒܕ ܐܝܟ ܕܡܪܬܗ ܠܟܠ ܠܘܥܡܐ ܙܘܢܐ ، ܗܘ ܒܪܙ ܚܕܪ ܐܗܐ ܠܘܥܡܐ ، ܘܡܫܟܚ ܠܕܒܩܬܗ ܒܝܗ . ܒܬܪ ܗܕܟ ܒܪܝܐ ܐܪܒܥܬܗ ܡܢ ܦܠܛܐ ܕܠܠܝܘܬܗ . ܡܬܪܘܝܐ ܠܚܢܩܐ ܕܢܫܬܐ ܠܐܝܢܒ ܠܘܥܡܐ ܙܘܢܐ ܐܘ ܫܡܫܐ . ܘܬܪܙ ܥܡܐ ܡܣܠܐ ܪܥܠܝܬ . ܘܒܬܪ ܗܕܟ ܚܠܒ ܦܠܚܐ ، ܒܡܐ ܕܬܪܙܝܢ ܠܗܘ ܡܢ ܘܡܘܪܐ ܫܡܫܐ . ܘܡܘܪܐ ܘܚܝܟ . ܐܝܠܐ ܐܝ ܠܐ ܚܘܪ ܦܠܚܐ ܒܘܥܪܗ ܚܘܪܬܐ (ܐܘܦܝܬܐ) ܡܐ ܕܪܒܝܢ ܒܝܗ ، ܘܗܘ

ܟܹ̈ܐܦܹܐ ܘܡܲܟ݂ܵܐ . ܘܡܲܠܟܵܐ ܦܹܝܫ ܒܕܲܒܵܫ̈ܵܐ ܐܵܗܵܐ ܙܲܢܕܵܐ . ܕܗܘܼ ܝܠܹܗ ܚܲܕ ܙܲܢܵܝܹ̈ܐ ܡܼܢ
ܡܫܲܬܠܡܵܢܘܼܬܵܐ ܕܒܲܝܬܵܐ ܒܡܫܲܬܠܡܵܢܘܼܬܵܐ ܡܫܲܚܠܦܬܵܐ .

ܐܝܬ ܠܗ ܓܘܼܦܵܐ ܘܩܘܪܡܵܐ . ܐܝܟ ܫܸܪ̈ܫܹܐ ܣܘܼܟ݂ܵܝܹܐ ܕܡܲܚܘܝܵܢ ܨܘܼܪܬܵܐ (٥ ـ ٩) . ܘܟܠ ܕܐܝܟ ܗܵܕܵܐ ܡܲܦܩܵܢܘܼܬܵܗ ܕܡܲܦܩܝܼܢ ܠܫܸܪ̈ܫܹܐ ܠܐܪܥܵܐ . ܘܡܲܦܩܝܼܢ ܠܓܘܼܠܵܐ ܐܘ ܩܘܪܡܵܐ ܠܒܲܝܬܵܐ ܕܫܸܪ̈ܫܹܐ ܣܘܼܟ݂ܵܝܹܐ ܠܗ ܓܲܪܡܵܐ . ܘܡܼܢ ܗܘܼ ܦܲܠܓܵܐ ܦܹܝܫ ܫܸܪ̈ܫܹܐ ܐܲܪ̈ܥܵܢܵܝܹܐ ܡܲܡܘܦܩܵܢܹܐ ܐܝܬܝܗܘܿܢ . ܟܠ ܫܸܪ̈ܫܘܼܬܵܐ ܣܘܼܟ݂ܵܝܬܵܐ ܡܼܢ ܦܲܬܵܐ ܕܐܲܪܥܵܐ . ܘܐܵܗܵܐ ܡܲܦܩܹܝܢ ܠܗܲܡܡܵܬܵܐ ܘܡܲܫܪܝܵܢܘܼܬܵܐ ܕܡܲܫܝܵܢܘܼܬܵܐ ܗܘܼܝܵܐ ܕܪܘܼܒܵܠ ܕܦܘܼܫܵܐ .



ܨܘܼܪܬܵܐ (٥ ـ ٩) ܫܸܪ̈ܫܹܐ ܣܘܼܟ݂ܵܝܹܐ (ܥܸܩܵܪ̈ܵܐ ܕܟܘܿܪܡܵܐ)

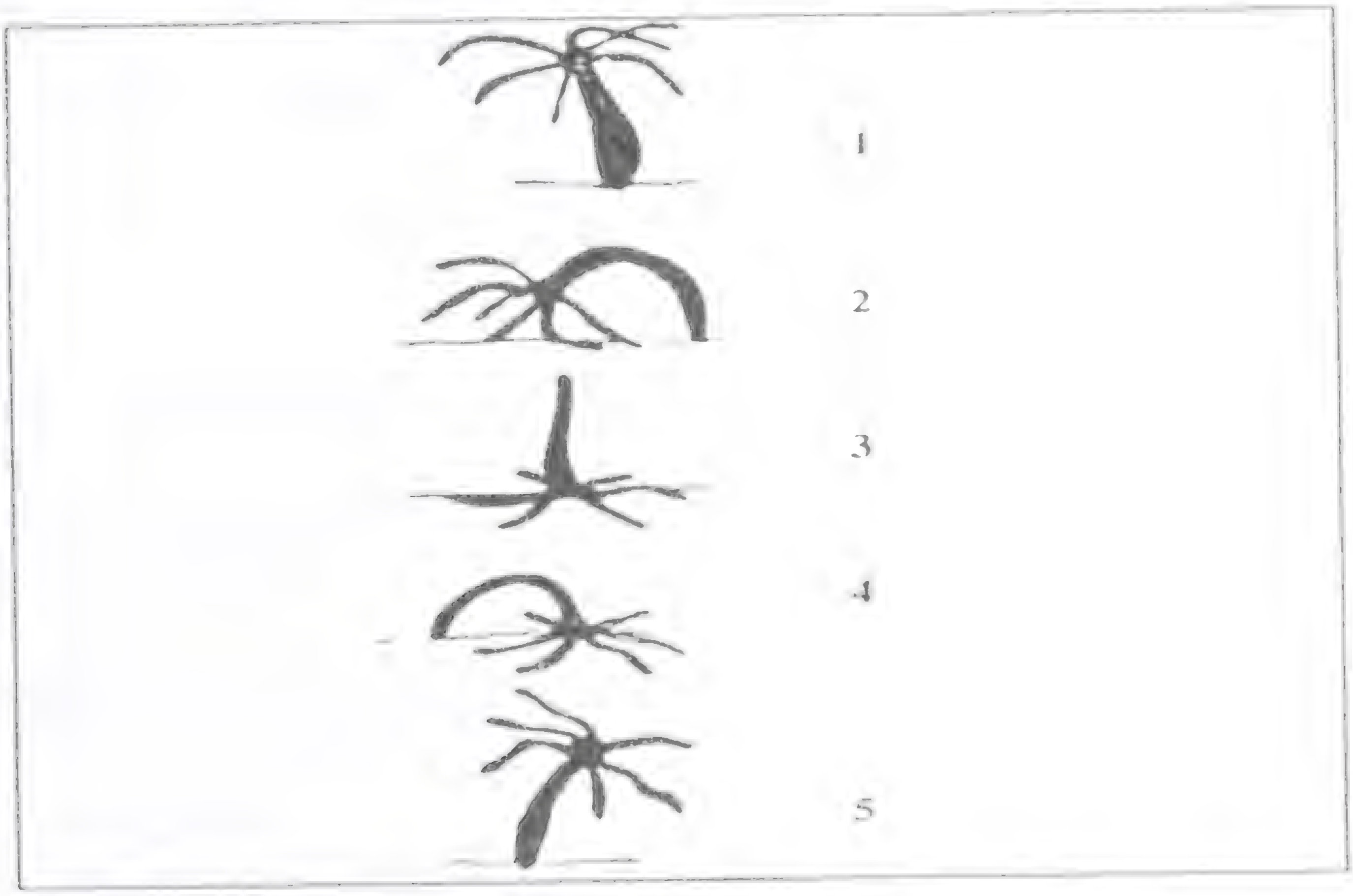
٦ ـ ܙܘܼܢܵܝܹ̈ܐ ܠܗ ܚܢܘܛܵܐ :

٦ . ١ ـ ܗܘܼܕܵܪܵܐ :

ܦܪܝܫܬܵܐ ܝܠܗ ܗܘܼܕܵܪܵܐ ܒܡܲܫܬܲܡܠܝܵܢܘܼܬܵܗ ܠܓܸܒܵܐ . ܘܗܘܼ ܝܠܗ ܒܘܼܟ݂ܪܵܐ ܕܦܪܝܫ ܠܟܠܗ ܚܢܘܛܵܐ ܕܟܢܝܫܵܐ ܡܘܪܒܝܬܵܐ . ܘܗܘܼ ܟܡܲܫܠܡܹܗ ܡܫܲܢܝܵܢܵܐ ܡܼܢ ܠܘܼܦܵܐ ܕܡܲܣܒܘܼܬܵܗ ܡܼܢ ܟܲܪܒܘܼܣܹܗ . ܕܟܠ ܡܫܲܠܡܵܢܵܐ ܕܪܘܒܘܗ . ܐܝܬܐ

ܣܘܟܐ ܡܬܬܢܝܢܐ ܐܝܟ ܕܒܢܐ ܠܗܐ ܗܘܝ ܕܠܡܘܒܠܬܐ ܕܦܬܝܟ. ܐܝܬ ܐܦ ܐܘܚܐ ܐܦ ܠܗ ܗܘܠܟܐ ܕܗܝܕܪܐ ܐܝܟ ܡܬܢܝܢܐ ܡܢ ܕܘܟܘ ܒܠ ܒܠܬܢܝܗ. ܘܗܘ ܟܕ ܡܫܬܢܐ ܠܗܘܠܟܐ ܕܡܬܘܬܗ. ܘܡܬܡܢܐ ܒܘܟܐ ܠܠܒܝܢܐ ܐܘ ܒܘܟܢܝܬܐ ܕܘܟܬܢܝܐ. ܡܫܬܢܐ ܗܠܝܢ ܠܡܬܢܝܢܐ ܡܢ ܕܘܟܬܐ ܠܐܚܪܬܐ. ܘܠܗ ܗܝܕܪܐ ܡܟܝܠ ܐܦ ܠܚܢܐ ܒܡܫܬܢܝܢܘܬܐ. ܒܝܘܪܬܐ ܒܝܬ ܦܬܝܠܬܐ. ܡܠܗܘܦܢܐ ܒܪܓܠܐ ܐܝܟ ܒܘܬܢܝܐ. ܠܗ ܡܬܡܢܝܐ ܕܒܘܪܬܐ ܡܪܟܢܐ ܒܡܫܬܢܝܢܘܬܐ (ܦܬܐ). ܘܪܓܠܐ ܣܘܪܕܢܐ ܒܡܬܡܢܐ ܕܒܘܪܬܐ ܕܪܬܡܬܐ ܪܡܫܬܐ. ܟܕ ܐܝܬ ܪܓܠܐ ܠܟܕܒ ܡܫܬܢܐ ܠܣܘܟܐ ܡܢ ܡܦܩܢܘܬܐ ܐܘ ܡܬܚܫܒܬܐ ܕܠܗܡܘ ܐܫܠܘܢܐ. ܢܦܫܐ ܗܝܕܪܐ ܠܗܡܘ ܒܐܫܟܚܬܐ ܕܐܫܦܪܐ ܐܠ ܡܬܚܝܐ ܡܠܗ ܒܝܢ (ܗ - ١٠) ܕܡܫܡܫܐ ܟܕ ܗܘ ܒܝܬܐ ܠܡܚܕܘܪܗ. ܟܕ ܗܘܝ ܡܬܚܫܒܐ ܠܗ ܡܢܕܪܝ.

ܡܫܬܢܐ ܗܝܕܪܐ ܡܬܡܬܐ ܙܘܥ ܡܬܚܫܒܐ ܘܒܫܘܪܗܝܢ ܡܬܡܫܡܫܐ ܒ ٨ - ١٠ ܡܢ ܒܬܠܬܐ. ܒܡܬܚܬܐ ܕܡܬܡܢܐ ܒܗܘ ܙܘܥܐ. ܘܠܪܓܠܗ ܒܢܣܘܟܐ ܡܢ ܠܒܪܐ ܗܦܟܐ. ܘܐܗܘܐ ܒܠܗ ܙܘܥܐ ܒܪܓܠܐ. ܐܦ ܡܫܬܢܐ ܠܡܬܢܝܢܐ ܡܢ ܕܘܟܘ ܒܡܠܟܬܐ ܐܘ ܙܘܥܐ ܡܠܟܬܢܝܐ ܐܫܟܚܬܐ (ܗ - ١٠).



ܐܫܟܚܬܐ (ܗ - ١٠) ܙܘܥܐ ܡܠܟܬܢܝܐ ܠܗ ܗܝܕܪܐ

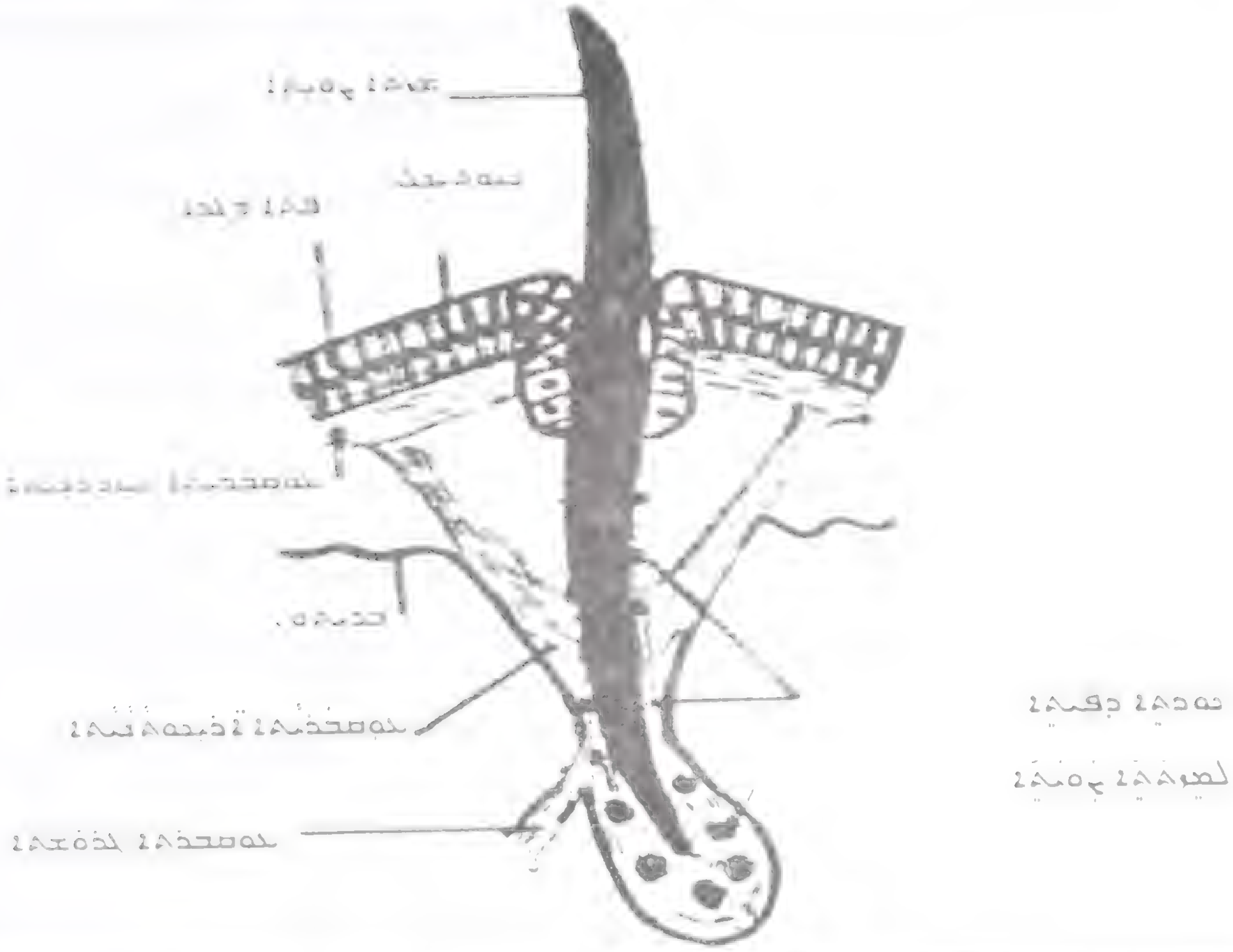
ܟܝܦܐ ܗܘܝܬܐ ܠܘܬܗ ܒܥܘܕܢܐ ܕܒܪܝܬܐ ܡܕܡ ܐܝܬܘ. ܗܘ ܕܡܬܚܫܒ ܡܬܩܪܝܢܐ ܘܡܫܘܚܬܐ ܦܘܡܐ ܒܐܪܥܘܬܐ. ܐܝܟ ܗܕܐ ܡܫܬܕܪܐ ܡܬܚܡܢܐ. ܘܡܬܚܙܝܐ ܠܘܬܗ ܗܘ ܕܡܢ ܡܬܚܡܢܐ ܠܟܠ. ܐܝܟ ܗܕܐ ܡܬܚܫܒܐ ܠܗ ܡܬܕܪܝܢ. ܟܕ ܡܢ ܠܡܬܚܡܢܐ ܒܥܘܕܢܐ ܕܒܪܝܬܐ ܕܡܕܡ ܐܝܬܘ. ܗܘ ܕܠܟܠܗܝܢ ܐܪܥܘܬܐ. ܐܝܟ ܗܕܐ ܡܫܬܕܪܐ ܠܡܬܩܪܝܢܘܬܗ ܘܡܫܘܚܬܐ ܦܘܡܐ ܡܢ ܐܪܥܘܬܐ. ܘܡܬܚܙܝܐ ܠܗܘܢ ܠܟܠ ܕܗܘܕܐ.

ܡܫܬܕܪܐ ܗܝܕܝܢ ܢܦܠܘ ܡܢ ܐܪܥܘܬܐ ܕܡܬܚܙܝܐ ܒܝܘܡ ܫܒܝܥܝܐ ܠܗܘܢ. ܘܡܬܢܚܐ ܠܢܘܗܪܐ ܠܗ ܡܢܗ.

٦ ـ ٢ ـ ܬܘܠܕܬܐ ܕܐܪܥܐ :

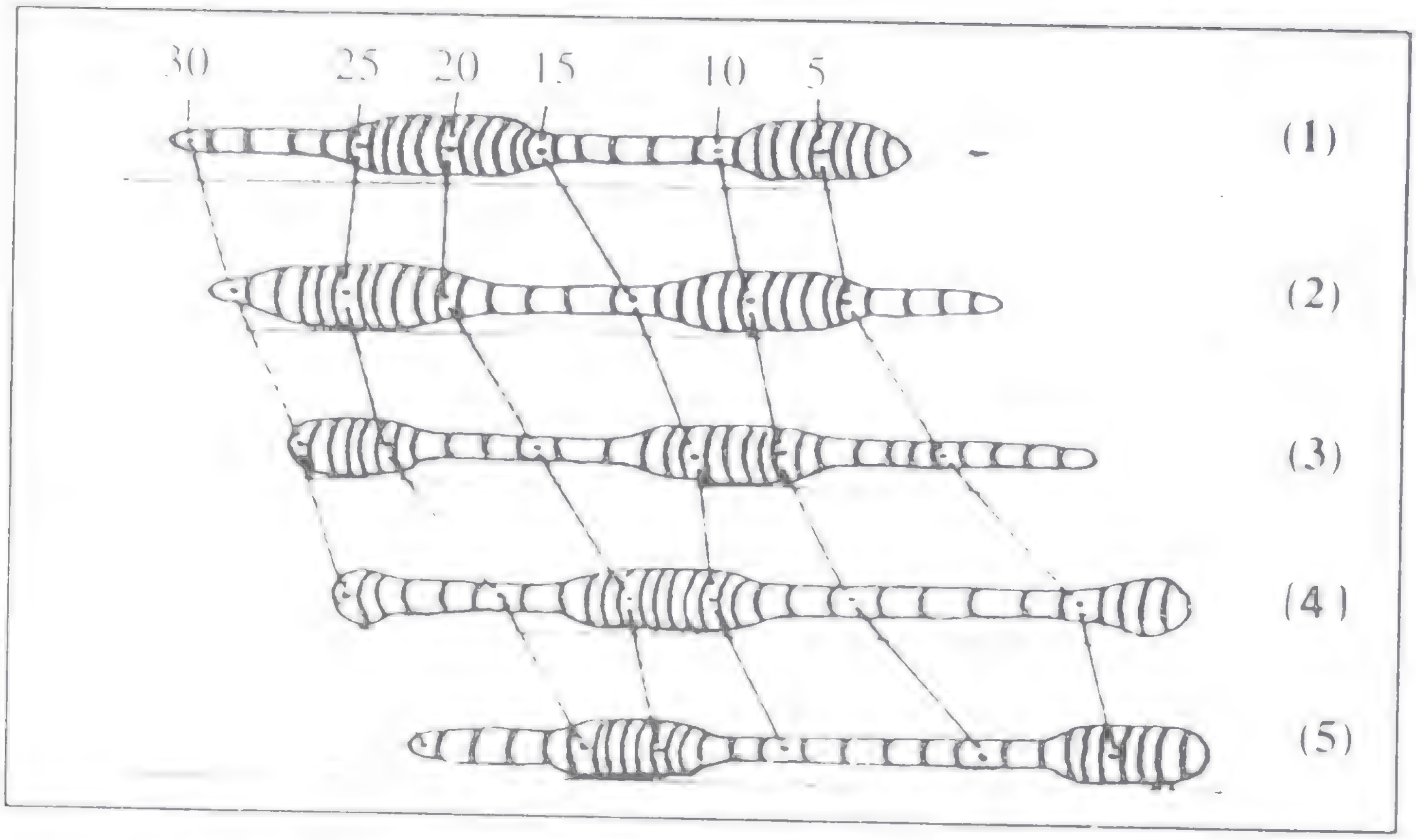
ܬܘܠܕܬܐ ܕܐܪܥܐ ܐܝܬܝܗ̇ ܡܢܘܬܐ ܙܘܥܬܐ. ܡܬܚܫܒܝܢ ܒܐܪܒܥܐ ܙܒܢܐ ܒܟܠ ܚܕܐ ܫܠܡܘܬܐ ܡܢ ܫܠܡܘܬܐ ܕܠܘܬܗ. ܒܬܘܡ ܡܢ ܗܕܐ ܫܠܡܘܬܐ ܡܕܡܝܬܐ ܘܐܚܪܝܬܐ. ܗܕܐ ܙܒܢܐ ܡܢܗ ܒܪܫܝܬ ܘܗܕܐ ܙܒܢܐ ܐܚܪܝܢܐ ܕܦܬܝܐ (ܕܚܘܪ ܠܒܪܫܝܬ ١ ـ ١٩).

ܢܦܠ ܗܘܡܐ ܡܬܚܡܢܐ ܠܟܠ ܡܫܘܚܬܐ ܙܘܥܬܐ ܠܗ ܚܕ ܒܥܡܐ. ܒܠܗ ܒܥܡܐ ܕܡܫܘܚܬܐ ܙܘܥܬܐ. ܗܘ ܕܢܦܠ ܒܐܪܥܐ ܠܗ ܠܘܬܗ ܕܬܘܠܕܬܐ. ܘܢܦܠ ܗܘܡܐ ܡܪܘܢܐ ܡܢܗ ܒܪܝܬܐ ܕܠܘܬܗ. ܐܦܢ ܠܡܫܘܚܬܐ ܙܘܥܬܐ ܒܪܝܬܐ ܕܠܝܬܗ ܢܦܠܐ ܒܡܪܘܡܬܐ ܕܒܥܡܐ ܕܡܫܘܚܬܐ ܙܘܥܬܐ. ܘܗܝ ܡܛܠ ܒܐܦܝܬܐ ܕܫܒܥܐ ܡܫܘܚܬܐ ܫܒܥܬܐ. ܐܘ ܦܬܠܗ ܡܬܠܘܬܬܐ ܢܗܝܪܬܐ. ܘܐܬܐ ܐܝܬ ܠܡܬܕܪܢܘܬܐ ܕܡܬܚܝܢ ܠܡܫܘܚܬܐ ܙܘܥܬܐ. ܐܘ ܒܡܬܒܪܝܢܘ ܠܗ ܒܥܡܗ. ܐܘ ܡܬܚܠܦܬܐ ܕܙܘܥܬܗ. ܠܡܢܬܐ ܠܡܘܢܬܐ ܒܝܬ ܝܘܡܐ (ܒܪܫܝܬ ٥ ـ ١٢) ܘܝܘܡܐ ܕܡܫܘܚܬܐ ܡܬܚܫܒ ܥܠ ܗܘܕܝܐ ܕܬܘܠܕܬܐ ܒܐܪܥܘܬܐ. ܐܘ ܗܘ ܗܘܐ ܬܘܠܕܬܐ ܒܡܬܡܢܬܐ ܡܢ ܡܬܗܘܝܢܘܬܐ.



ܐܝܩܘܢܐ (٥ - ١١) ܨܘܪܬܐ ܡܦܫܩܐ ܠܒܘܠܒܐ ܕܣܥܪܐ

ܣܓܝ ܙܥܘܪܐ ܒܘ̈ܢܐ ܡܦܩܬܐ ܕܣܥܪܐ ܠܗܡܒܪܬܐ ܚܘܦܪܬܐ ܘܐܕܝܘܢܬ̈ܐ ܚܘܒܠܝܐ. ܘܡܢ̈ܟܝ ܡܦܩܢܘܬܐ ܚܣܪܬܐ ܠܡܪܟܢܬܐ. ܘܡܢ̈ܟܝ ܠܒܗܪܬܐ ܒܐܝܩܘܢܐ ܕܠܥܠ. ܐܝܟ ܡܪܟܢ ܓܘܠܒܬܐ ܠܡܪܟܢ. ܡܒܪ̈ܢ ܡܦܩܢܘܬܐ ܕܗܡܒܪܬܐ ܐܕܝܘܢܬ̈ܐ. ܠܟܢܒܬܐ ܕܫܠܡܬܐ ܒܪܝܬܐ ܘܫܠܝܡܬܐ ܘܠܡܣܬܐ ܕܡܘܬܐ ܓܘܢܐ. ܐܝܟ ܡܦܩܢܘܬܐ ܕܗܡܒܪܬܐ ܚܘܦܪܬܐ. ܡܒܪ̈ܢ ܓܘܪܣܬܐ ܕܫܠܡܬܐ ܘܚܠܦܪܘܬܐ ܕܡܠܒܫ. ܘܠܪܥܬܐ ܕܡܘܬܐ ܓܘܢܐ ܠܓܘ ܒܝܬܗ ܐܝܩܘܢܐ (٥ - ١٢).



ܨܘܪܬܐ (٥ - ١٢) ܪܘܡܐ ܕܘܠܓܬܐ ܠܘ ܕܘܠܓܬܐ ܕܪܕܝܐ ܒܕܘܟܬܐ ܚܕܐ
ܕܐܝܬ ܠܕܐܝܬ ܕܚܠܘܦܬܐ .

٦ - ٣ - ܦܘܠܓܬܐ :

ܩܕܡ ܥܡܠܐ ܕܐܬܐ ܒܗܘܦܟܐ ܠܦܘܠܓܬܐ . ܡܛܠ ܐܝܟ ܡܚܝܢ ܐܪܥܐ ܡܬܚܠܦܐ . ܡܢ ܙܘܓܐ . ܘܗܕܐ ܚܒܪܐ ܠܗܘ . ܒܗܘܦܟܐ ܒܝܬ ܓܒܐ ܐܠܝܗ . ܘܐܝܬܐ ܡܬܚܝܒܐ ܡܢܐ ܐܢܬܝܬ ܠܣܘܟܐ ܥܠ ܒܪܘܐ . ܐܝܟܐ ܕܐܝܟܐ ܡܢܝܢܗ ܚܕܐ ܠܗ ܡܢܐ . ܘܐܝܟܐ ܡܢܝܢܗ ܦܪܝܫ . ܕܐܝܬ ܐܢܬܠܗܘܢ . ܗܠܝܢܐ ܙܘܓܐ ܡܢ ܐܢܫܐ ܦܘܠܓܬܐ . ܡܟܝܠ ܟܠ ܙܘܓܐ ܡܢ ܚܕ ܡܢ ܗܠܝܢܐ ܡܬܚܠܦܐ ܓܒܪܝܐ . ܥܠ ܕܗܘܐ ܙܢܐ ܕܐܝܬ ܒܕܡܘܬܐ ܗܠܝܢ ܐܝܟ ܒܘܢܐ ܕܡܬܢܬܐ ܐܢܫܐ . ܘܐܝܟܐ ܠܗܘܢ ܐܢܬܠܗܘ . ܗܕܐ ܙܘܓܐ ܡܢ ܠܘܠܦܐ . ܒܕܐ ܡܢ ܗܕܐ ܡܬܚܠܦܐ ܓܒܪܝܐ ܗܟܢܐ ܘܠܝܠܬܐ .

ܡܦܠܚ ܕܐܝܬ ܚܫܘܒܬܐ ܡܢ ܗܘܡܦܐ ܕܡܬܚܠܦܐ ܠـ ١٠٠٠ ܒܘܠܕܬܐ ܠܟܠ ܠܒܪܐ ܡܢ ܒܘܡܒܪܢܝܬܐ ܠܗ ܒܟܕܬܐ . ܘܗܝ ܗܠܝܢ ܚܫܘܒܬܐ ܕܠܠܒܐ ܠܡܦܪܢܐ ܕܡܦܠܚܬܐ ܕܗܘܡܦܐ ܠܗ ܒܘܡܒܪܢܝܬܐ ܕܦܘܪܢܝܬܐ ܡܢܝܢܐ ܕܠܗܘܢ . ܘܟܠܗܘܢ ܒܘܡܒܪܢܝܬܐ ܠܗ ܕܐܝܬ ܡܬܦܪܢܝܬܐ ܡܢܐ ܐܝܟ ܒܘܡܒܪܢܝܬܐ ܒܝܬ ܓܒܐ ܡܢܐ ܡܢ ܒܘܡܒܪܢܝܬܐ ܒܟܝܢܝܬܐ ܠܦܘܠܓ ܙܘܓܐ ܡܠܘܠܐ ܡܬܚܠܦܢܐ ܥܠܝܗ . ܒܡܒܝܢ ܡܛܠ ܕܪܒܐ ܕܒܟܪܘܬܐ ܕܐܝܬܐ . ܘܡܬܚܙܝܐ ܗܠܝܢ ܕܡܬܚܙܝܐ ܡܢܝܢܗ ܡܢܝܢ ܕܡܬܚܙܝܢ ܠܦܪܘܩܐ ܕܠܠܒܠܗܘܢ . ܒܘܡܦܐ ܡܬܚܙܝܐ ܠܗܘ . ܐܘ ܒܝܕ ܕܐܝܬܘܬܐ ܕܘܪܒܬܐ ܒܚܫܘܒܬܐ ܠܦܘܪܩܢܗ .

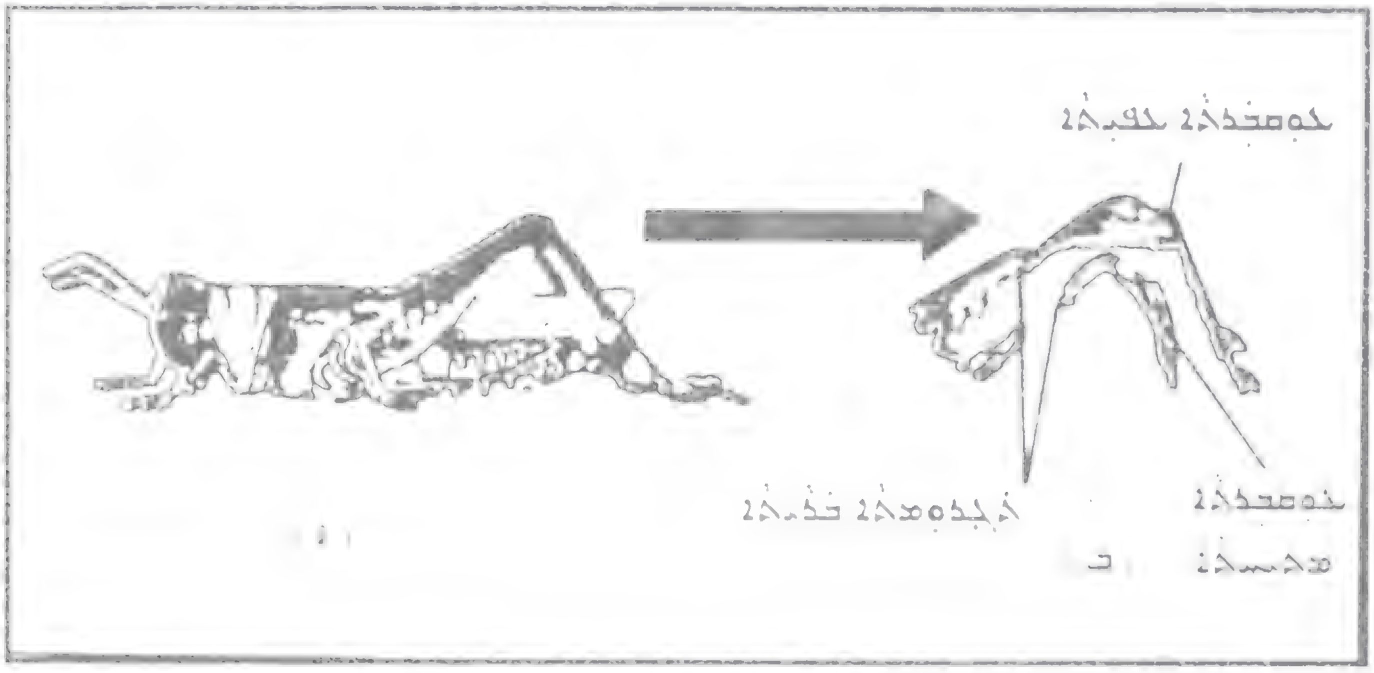
٤ — ٣ — ١ ـ ܦܫܚܐ :

ܦܫܝ ܪ̈ܟܐ ܡܢ ܪ̈ܓܠܐ ܡܫܢܐ ܕܡܣܬܪܘܩܬܐ. ܟܕ ܐܝܬ ܗܢܘܢ ܕ̈ܟܐ ܠܗܘܢ ܥܠ ܗܕܝ ܘܥܠ ܐܣܛܐ ܡܢ ܐܡܠܐ. ܗܘܝ ܐܡܠܐ ܕܦܫܚܐ ܥܢܫܝܬܐ. ܘܒܠܚܘܕ ܓܢܣܝ ܟܕܡܬܐ ܡܢ ܦܘܬܐ (ܬܪܝܢ ܡܘܬܢܐ). ܘܚܘܝ ܐܡܠܐ ܠܡܢܐ ܒܝ ܟܘܢܬܐ ܒܠܝܬܐ ܐܘ ܠܦܢܝܬܐ. ܘܡܫܘܠܐ ܕܦܫܚܐ ܟܡ (٣ ـ ٦٠) ܦܫܚܐ ܠܗ ܕܦܦܐ.

٤ — ٣ — ٢ ـ ܕ̈ܫܬܐ :

ܗܘ ܦܘܠܐ ܕܕܫܬܐ ܟܝ ܦܕܫܬܐ ܠܗ ܕܫ̈ܬܐ ܒܠܗ ܐܘܕܢܐ ܒܝܒܫܬܐ ܒܠܒܬܗ ܐܡܠܐ. ܟܕ ܘܝܠܒ ܗܕܗܝ ܐܡܠܐ ܡܕܡܬܐ ܘܒܠܒܬܐ ܗܡܠܬܐ ܘܐܡܠܐ ܡܘܫܠܬܐ ܒܝܫܬܐ ܒܟ ܣܕܪܐ. ܐܒܢܐ ܘܝܠܒ ܐܦ ܗܠܗ ܐܡܠܐ. ܐܣܕܢܐ ܟܘܢܒܐ. ܘܟܠܗ ܐܘܕܢܐ. ܡܦܫܐ ܕܫܬܐ ܗܠܗ ܡܢ ܐܡܠܗ ܥܠ ܐܕܟܐ ܐܡܒܢܝܢ. ܘܐܘܐ ܟܕܪܐܠܗ ܡܘܫܬܐ ܠܢܛܪܬܐ ܕܡܫܠܘܬܗ ܘܡܠܬܐ ܡܠܘܠܬܐ. ܐܦ ܡܕܫܝܢ ܡܢ ܗܕܡܠܬܐ ܕܐܡܠܗ ܒܟ ܣܕܪܐ. ܘܫܟܝ ܘܡܟܐ ܕܟܠ ܐܡܠܐ ܟܢܦܬܐ ܟܕ ܗܘܝ ܦܫܛܬܐ ܠܒܢܐ ܕܘܟܦܬܐ ܕܠܘܡܫܐ ܘܟܐܡܫܡܐ ܡܫܟܕܬܐ ܒܟ ܥܕܟܐ ܕܐܡܠܐ. ܘܟܕܢܐ ܥܠܛܢܬܐ ܥܠ ܘܡܟܐ ܕܐܡܠܐ ܡܢ ܣܒܠܐ ܠܢܓܪܐ ܟܕܗܢܐ. ܘܡܟܫܘܢܐ ܡܠܗ ܕܕܫܬܐ ܐܝܟܠܗܘ. ܗܕܝ ܠܢܓܪܐ ܕܡܘܘܕܝ ܠܟܠ ܟܘܡܟܕܬܐ. ܢܟ ܡܢܝܗ ܠܘܡܟܢܐ ܡܠܘܠܬܐ ܡܝܬܠܬܢܐ ܐܝܟ ܢܒܫܬܐ. ܘܐܣܕܢܐ ܠܘܡܟܐ ܢܝܫܐ ܐܝܟ ܕܫܬܐ. ܘܐܝܟ ܕܢܓܪܐ ܡܡܝܠܐ ܗܐ ܠܗܦܡܐ. ܡܕܟ ܠܗܡܟܗ ܥܠ ܗܕܝ ܘܥܠܐ ܠܡܕܡܢܐ ܡܢ ܐܡܠܐ. ܟܕ ܗܘܝ ܦܫܛ ܗܕܗܝ ܐܡܠܗ ܟܗܕܢܬܐ ܡܢܬܠܐ ܟܢܡܠܐ ܕܟܘܡܟܕܢܬܐ ܕܢܛܪܬܐ ܕܘܕܟܬܐ ܐܗܟܡܢܐ (٥ ـ ١٣) ܢܕܝ ܕܫܬܐ ܕܦܘܚܝ ܕܘܢܒܐ (Spring tail) : ܘܒܠܗ ܕܫܬܐ ܘܟܘܕܐ ܫܢܝ ܠܗ ܦܫܬܐ ܕܡܠܢܬܐ. ܘܠܗܘܢ ܡܕܘܢܐ ܕܟܕܟܬܐ ܘܟܡܫܬܐ. ܟܢܡܠܐ ܕܦܘܟܐ ܕܦܘܚܢܐ. ܟܕܐ ܥܠ ܡܛܠܐ ܟܕܗܢܐ ܕܟܒܠܢܐ. ܘܐܝܟ ܕܗܘܢܐ ܕܫܬܐ ܥܟܝܫܬܐ، ܟܘܟܐ (Furcula) . ܦܫܛ ܟܢܦܐ ܗܣܘܗ ܟܕܗܢܐ ܘܟܝܡ ܟܡܕܐ ܓܠܝܬܐ ܘܟܕܢܐ ܡܢ ܡܛܠܐ ܟܕܗܢܐ ܗܠܒܬܐ. ܘܐܝܟ ܕܦܫܛܐ ܟܘܡܟܕܬܐ ܡܗܫܝܬܐ ܠܟܘܟܐ. ܗܘ ܐܣܕܢܐ ܥܕܐ ܡܢ ܕܒܕܗ

ܠܓܢܒ ܠܒܪܗ . ܟܕ ܗܘܝܐ ܠܒܫܬܐ . ܟܕ ܡܣܝܐ ܠܦܪܚܐ ܒܝܠܬܐ . ܡܠܝܬܐ
ܠܒܪ̈ܝܬܐ ܕܓܘܫܡܐ ܝܠܗ ܗܘܐ .

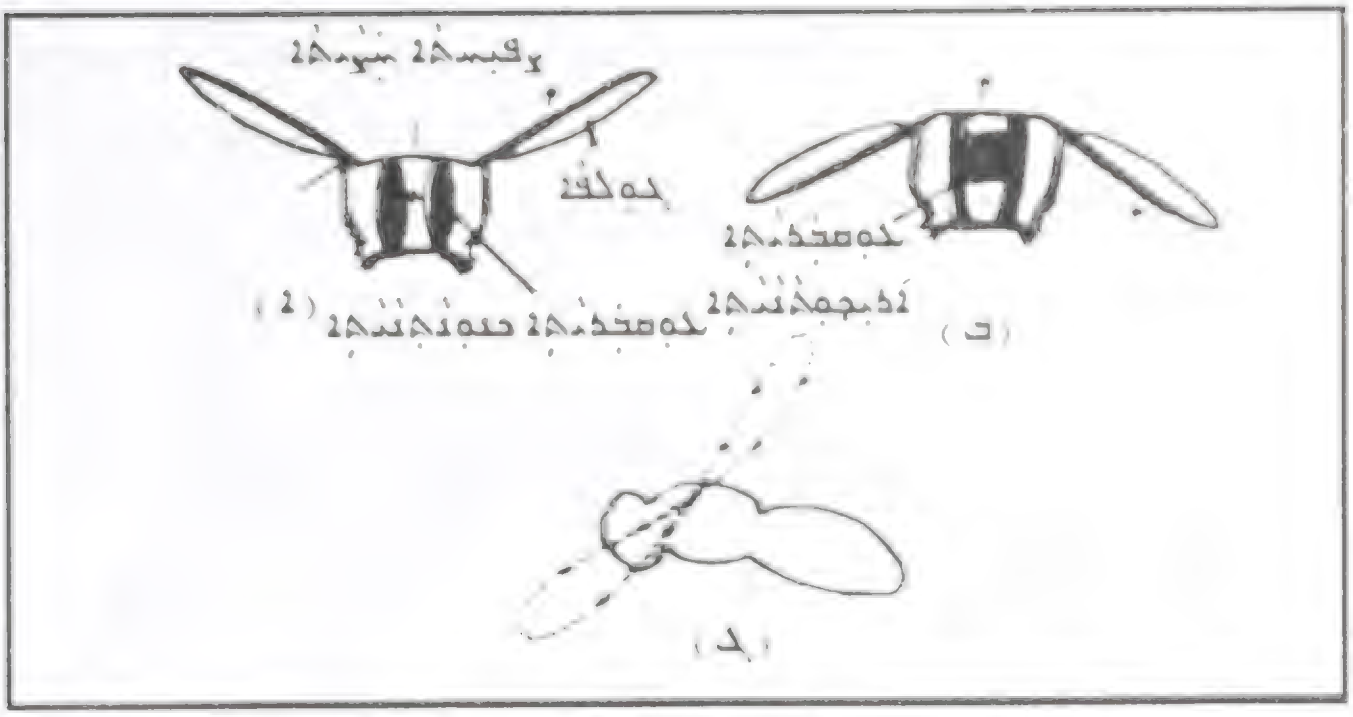


ܨܘܪܬܐ (٥ — ١٣) ܩܡܨܐ

ܘܐܦ ܚܘܪܐ ܕܦܬܚܐ ܘܐܠܝܐ . ܘܐܝܟ ܝܠܗ ܕܫܝܢܐ ܘܚܘܪܐ ܡܨܝܐ ܠܐܘܡܢܐ ܡܓܡܝܢܝܢ ܓܘ̈ܫܩܐ ܒܐܘܪܚܘܬܐ ܡܕܡܝܢܝܬܐ ܠܐܘܪܚܘܬܐ ܕܢܦܫܬܐ ܝܠܗ ܩܡܨܐ . ܐܘܟܝܟ ܟܡܐ ܣܐܕܐ ܕܦܬܚܐ ܐܝܠܐ ܒܡܫܐܕܬܐ ܗܕܘܝܬܗ . ܐܝܟ ܒܘܡܒܐ ܕܚܕܘܪܐ ܝܠܗ ܐܝܟ ܫܝܢܐ . ܦܪܝܫܐ ܡܢܐ ܡܢ ܐܝܟ ܕܝܠܗ ܩܡܨܐ .

٦ — ٣ — ٣ - ܓܘܫܩܐ :

ܠܚܘܫܒܘܬܐ ܕܫܝܢܐ ܡܢܝ ܓܘܫܩܐ ܐܝܬ ܬܠܬܐ ܘܟܠܐ ܡܢ ܓܘܫܩܐ . ܟܠܐ ܟܠ ܓܘܫܩܐ ܡܢ ܚܕ ܦܪܬܐ ܡܢ ܦܬܘܚܬܐ ܒܪܝܬܐ . ܢܦܠ ܓܒܝܢ ܡܢܕܝܐ ܕܦܝܣܬܐ ܚܕܝܬܐ (Tergum) . ܘܦܝܣܬܐ ܕܦܢܝܬܐ (Pleuron) ، ܘܓܘܫܩܐ ܝܠܗ ܡܓܡܢܐ ܒܚܫܢܐ ܡܢ ܦܬܘܚܬܐ ܒܪܝܬܐ . ܝܕܠܗ ܡܢܝܐ ܘܠܝܕܐ ܘܚܝܬܐ ܕܡܢܐ . ܦܪܝܫܐ ܝܠܗ ܕܟܠܐ ܕܦܘܫܬܐ ܕܓܘܫܩܐ ܝܠܗ ܫܝܢܐ ܡܬܚܠܦܐ ܘܡܢܐ ܐܝܬ ܓܘܫܩܐ ܝܠܢܐ ܠܦܬܚܐ . ܐܝܟ ܕܡܬܝܢ ܕܟܠܐ ܟܪܘܟܐ ܡܢ ܕܡܘܬܐ . ܘܡܢܐ ܐܝܬ ܓܘܫܩܐ ܝܠܕܢܐ ܠܫܘܦܐ . ܡܛܐ ܓܘܫܩܐ ܒܬܪܝܐ ܕܦܬܘܚܬܐ ܒܪܝܬܐ ܡܛܝܬܐ ܓܢܒܐ . ܘܟܕܐ ܘܟܠܐ ܕܓܘܫܩܐ ܠܟܠ ܘܠܒܫܗ ܡܢ ܢܛܠܘܬܐ ܝܠܗ ܦܝܫܐ ܕܡܛܝܬܐ ܕܓܘܫܩܐ (ܨܘܪܬܐ ٥ - ١٤)



ܨܘܪܬܐ (٥ — ١٤)

ܟܠܐ ܓܦܐ ܐܚܪܝܬܐ ܒܫܥܬܐ ܕܦܪܚܬܐ ܪܒܝܥܐ ܒܡܬܢܝܕܢܝܐ ܒܪܝܫܝܐ . ܘܡܬܢܝܕܢܐ ܡܬܢܦܚܬܐ ܠܐܢܫܝܐ ܕܗܢܐ ܒܠܚܘܕܝܐ . ܘܗܢܐ ܡܬܚܫܒ ܕܓܦܐ ܐܚܪܝܬܐ ܡܢ ܦܪܚܬܐ ܪܒܝܥܐ ܒܡܬܢܝܕܢܝܐ ܐܚܪܝܐ . ܘܡܬܢܝܕܢܐ ܠܗܠܝܬܐ ܕܗܢܐ ܒܠܚܘܕܝܐ . ܡܦܩܝܢ ܗܢܐ ܒܘܢܝܐ ܪܒܝܥܐ ܒܡܬܢܝܕܢܝܐ ܠܗ ܝܬܝܪܐ ܕܠܘܬܗ . ܘܡܬܚܫܒ ܒܚܠܝܨܘܬܐ . ܘܠܟܢ ܒܡܬܢܝܕܢܘܬܐ ܕܠܘܬܗ ܠܒܗܠܬܐ ܕܠܘܢܐ ܘܪܕܝܐ ܠܗ ܐܝܟܢܐ ܡܬܚܫܒ ܠܘܬܗ . ܡܢ ܝܠܕܐ ܕܦܪܚܬܐ ܕܐܝܬܝܗ ܢܦܫܢܝܐ ܘܡܬܬܘܣܦܢܝܐ . ܘܗܘܝܐ ܕܠܒܠܚܘܕ ܠܝܠ ܘܠܐ ܡܢܗ ܠܐ ܡܬܚܫܒ ܠܠܘܬܗ ، ܐܝܟܐ ܒܡܬܚܫܒܐ ܒܗܘܝܐ ܕܠܒܠܚܘܕ ܐܝܟ ܕܡܬܚܫܒ ܠܟܠ ܝܠܕܐ ܘܡܦܩܝ ܒܗܢܐ ، ܐܝܟ ܡܬܚܫܒ ܠܡܬܚܫܒܐ ܕܠܘܬܢܐ ܕܝܪܚܐ ، ܘܗܟܢܐ ܠܡܬܚܫܒ . ܗܢܐ ܘܗܟܢܐ ܒܝܬ ܠܒܗܪܐ ܐܝܟ ܕܗܘܐ ܠܒܠܚܘܕ ܠܗܢܐ ، ܘܡܬܚܫܒ ܠܡܬܚܫܒ ܒܗܘܢܐ ܡܢ ܡܬܚܫܒ ܒܫܥܬܐ ، ܐܝܟ ܐܝܟܐ ܕܗܘܐ ܒܠܚܘܕ ܠܝܠ ، ܗܘ ܡܬܚܫܒ ܠܡܬܚܫܒ ܒܝܘܡܐ ܒܝܬ ܝܠܕܐ ܡܢ ܡܬܚܫܒ ܒܫܥܬܐ . ܘܒܗܘܢܐ ܪܒܝܥ ܗܘܐ ܠܒܫܥܬܐ .

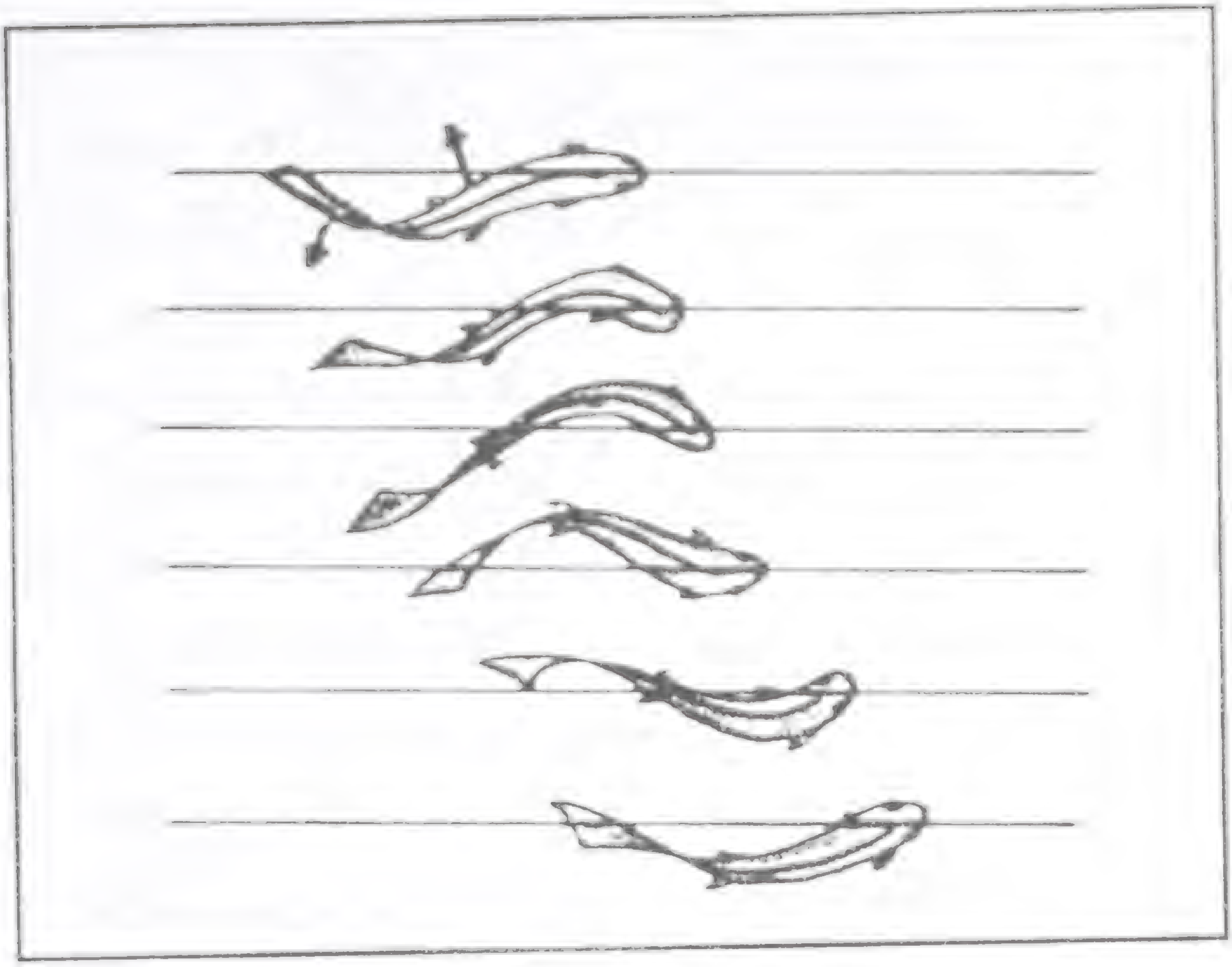
ܘܒܡܬܚܫܒ ܕܪܘܚܐ ܕܒܠܚܘܕ ܒܝܕܥܐ ܕܗܠܝܟܝܢ ܘܐܠܝܟܝܢ . ܡܬܚܫܒ ܠܒܗܠܬܐ ܕܒܠܚܘܕ ܒܟܝܠܐ ܡܬܚܫܒ ܒܪܘܚܐ ٨ . ܐܝܟܐ ܐܝܟ ܕܚܙܝܐ ܪܒܝܥܐ ܠܗ ܗܘܐ ܕܠܐ ܒܡܬܚܫܒ ܕܪܘܚܗ . ܒܠܚܘܕ ܪܒܝܥ ܒܗܠܬܐ ܘܐܠܝܬܐ ܕܠܐ ܢܬܚܫܒ ܕܪܘܚܗ . ܡܛܠ ܡܢܝܢܐ ܕܡܬܚܫܒ ܕܒܠܚܘܕ ܠܗ

ܓܠܝܬܐ ܪ̈ܘܪܒܬܐ ٤ ܐܘ ٥ ܡܫ̈ܚܬܐ ܠܗ ܪܦܦܐ . ܘܠܐ ܣܓܝܐܬܐ ܐܪ̈ܥܐ ܕܓܪܓܐ
٣٠٠ ܡܫ̈ܚܬܐ ، ܐܝܟܐ ܕܐܝܬ ܡܢܝܢܐ ܕܡܫ̈ܚܬܐ ܕܥܘܠܦܢܐ ܕܟܠܗ ܠـ ١٠٠٠
ܡܫ̈ܚܬܐ ܠܗ ܪܦܦܐ . ܐܢܫܘܬܐ ܢܪܘܝܬܐ ܠܗ ܪܘܚܐ ܒܠܗ ܐܝܬܘܬܐ ܕܪܕܝ
ܘܗܝܐ ܡܢ ܥܘܠܦܢܐ ، ܘܐܢܒ ܒܥܘܪܬܐ ܡܫܡܫܬܐ ܒܢܬܗ . ܐܝܟܐ ܪܘܚܐ ܡܕܡܝܢܐ .
ܐܢܒ ܠܒܥܠܬܐ ܕܐܝܟ ܘܗܝܐ ܠܗܘܢܫܐ . ܘܠܐ ܣܒܪܘܬܐ ܗܝ ܗܘܦܟܐ .
ܢܣܠܦ ܘܗܝܐ ܠܡܕܡܝܢܐ ܡܢ ܥܘܠܦܢܐ . ܠܐܝܕ ܒܫܢܐ ܡܫܚܬܐ ܠܘܗܝܐ ܒܫܪܪܐ
ܒܝܕܥܬܐ ܕܠܐ ܡܦܠܣܝܢ . ܐܝܟܐ ܠܗ ܐܚܠܐ ܕܝܠܐܒ ܥܘܠܦܢܐ ܐܟܡ ܘܒܥܘܪܐ
ܘܪ̈ܒܝܐ ، ܟܠ ܗܪܟ ܥܘܠܦܢܐ ܢܦܠܒ ܠܐܝܕ ܡܢ ܗܪܟ ܐܢ̈ܫܝܐ ܕܪܘܫܬܐ . ܦܠܚ
ܒܪܘܝܐ ܘܗܘܐ ܡܒܪܢܐ ܠܘܢܢܝܗܘܢ ܒܘܢܝܐ . ܘܠܐ ܘܗܝܝܐ ܥܘܠܦܢܐ
ܕܐܝܟ ܐܦܬܐ ܕܝܕܥܐ . ܒܫܘܫ ܕܘܗܝܐ ܒܫܪܪܐ ܡܢ ܥܘܠܦܢܐ . ܡܢܣܠܦ
ܠܗܪܟ ܪܘܡܝܐ ܣܘܓܪܐ ܘܒܘܪܐ . ܐܝܟ ܗܪܟ ܒܘܦܠܐ ܕܗܘܦܠܐ . ܐܝܟܐ
ܦܠܡܐ ܘܡܘܪܒܝܬܐ ܡܥܘܠܦܢܐ ܚܢܐ ܠܥܘܠܦܢܘܗܝ ܟܠܢܝܬܐ .

٦ — ٤ ـ ܦܪܢܣܝܬܐ :

٦ — ٤ — ١ ـ ܗܢܕܐ :

ܡܘܬܒܠܘܢ ܦܪܢܣܝܬܐ ܠܛܘܪܐ ܡܕܝܢܬܐ ܠܗ ܝܡܐ ، ܟܠ ܕܐܝܬ ܗܢܕܐ ܒܠܗ ܗܘ ܐܪ̈ܥܐ ܒܝܬ ܢܗܪ̈ܐ ܕܘܪܟܐ ܠܗܘܢ . ܒܘܝܐ ܐܝܬܠܘܢ ܠܗܪܟܐ ܪܘܡܢ̈ܐ ، ܘܕܘܒܪܐ ܒܗܪܪ̈ܬܐ ܢܥܒܕܐ ، ܣܠܝܩܐ ܡܢ ܗܪܘܢ ܕܦܢܝܬܐ . ܘܣܓܝܐ ܐܦܩܪܬܐ ܕܘܒܪܬܐ ܢܦܠܬܐ . ܘܐܟܒ ܡܫ̈ܚܬܐ ܕܕܘܒܪܐ ܠܗܪܟ ܐܢ̈ܫܐ ܠܛܘܪܐ ܙܘܥ ܠܡܕܡܝܢܐ ܒܡܘܪ̈ܘܒܐ ܕܐܝܬ ܚܕ ܣܓܠܐ ܕܡܫ̈ܚܬܐ ܘܦܢܝܬܗܘܢ (ܐܦܩܪܬܐ ٥ — ١٥) .



ܨܘܪܬܐ (٥ ـ ١٥) ܣܚܝܬܐ ܕܢܘܢܐ

ܐܝܟܐ ܕܡܦܪܬܐ ܐܚܪܝܐ ܦܠܚ ܠܡܫܘܚܬܐ ܕܓܘܫܡܐ ܘܡܫܚܠܦܬܐ ܕܙܘܥܐ . ܗܘ ܦܠܚ ܒܥܕܢܐ ܕܣܚܝܬܐ ܕܐܝܟ ܕܢܘܢܐ ܢܦܪܘܚ ܥܠ ܡܫܚܬܐ ܕܡܘܡܕܐ ܢܦܪܘܚ ܠܐܘܪܚܐ . ܗܢ ܥܘܢܐ ܕܓܘܫܡܐ ܕܣܚܝܐ ܗܘܘ . ܘܐܝܟ ܠܡܦܪܢܣܘܬܐ ܕܡܘܢܟܐ ܘܡܦܪܬܐ ܕܫܠܛܢܘܬܐ ܡܢܗܐ ܐܝܟ ܢܘܢܐ ܕܘܪܒܐ . ܗܘܝ ܫܠܝܛܐ ܙܘܥܐ ܣܓܝܐܐ ܒܪܥܢܐ . ܘܢܥܒܕ ܠܐܘܪܚܐ ܠܡܪܕܐ ܒܥܓܠܬܐ ܥܡܘܠܬܐ .

٦ ـ ٤ ـ ٢ ـ **ܪܓܠܬܐ :**

ܐܝܟ ܕܡܥܘܕܐ ܠܗܘ . ܦܪܬܢܘܬܐ ܠܣܚܝܬܐ ܥܠ ܝܒܫܐ . ܡܥܘܪܐܠܗܘ . ܡܩܠܘܚܐ ܥܡܝܩܐ ܘܚܠܝܐ . ܗܢܐ ܘܟܕ ܒܪܓܠܐ ܘܦܫܝܛܐ ܒܥܣܩܘܬܐ . ܐܝܟܐ ܗܢܐ ܥܒܕ ܚܘܘܐ ܡܣܝܠܐ ܘܒܪܢܐ . ܠܐ ܒܥܘܢܐ ܠܡܪܟܒܬܐ ܕܓܘܫܡܐ ܐܟܐ . ܐܝܟ ܗܢܐ ܥܒܕ ܘܐܪܥܐ ܕܘܟܬܐ ܐܝܟ ܗܢܐ ܕܢܘܢܐ ܕܪܥܘܦܐ .

٦ ـ ٤ ـ ٣ ـ **ܓܘܢܣܐ :**

ܙܠܐ ܗܢܐ ܓܝܪܐ ܡܢ ܪܥܘܦܐ . ܘܦܪܝܫ ܗܢܐ ܓܝܪܐ ܒܥܘܪܥܝܐ ܡܥܠܝܬܐ ܗܢܐ ܠܓܘܢܣܐ ܕܠܠܐ . ܡܢܝܢ ܡܫܠܡܬܐ ܕܡܘܡܕܐ ܕܓܪܡܐ ܘܣܘܢܕܐ ܕܪܥܘܬܐ ܕܦܪܢܣܬܐ ܗܢ ܣܕܪܐ ܘܐܠܐ ܦܓܪܐ ܘܓܪܡܐ ܕܙܓܕܐ ܓܒܘܪܐ ܘܣܕܪܗ . ܘܡܡܫܟܢܬܐ ܪܘܕܝܬܐ ܘܫܠܡܘܬܐ ܕܓܘܢܣܐ . ܘܦܪܐ ܕܦܠܚ

ܠܘܬܒܐ ܕܡܬܡܚܣܢܐ ܢܦܫܝܬܐ ܠܗܕܐ ܡܘܠܦܢܐ ܘܕܘܒܪܐ. ܘܡܬܕܪܐ ܠܐ
ܡܢ ܦܠܣܘܦܘܬܐ ܠܣܘܟܠܐ ܡܬܝܕܥܢܝܬܐ ܠܡܘܠܦܢܘܬܐ. ܘܡܫܪܪܐ ܘܒܠܚܘܕ ܡܢ
ܗܕܢܝܬܐ ܡܬܝܕܥܬܐ ܡܢ ܠܡܘܠܦܢܐ ܕܡܬܝܕܥܬܐ. ܐܦ ܥܒܕܘ ܚܕܡܢܐ ܕܥܘܦܐ
ܘܡܬܝܕܥܬܐ ܠܗ ܗܘܐ. ܕܝܢ ܡܠܟܐ ܠܗ ܗܘܐ. ܘܦܝܣ ܘܕܒܩܐ ܠܡܕܡܢܐ
ܒܥܠܡܐ ܕܙܘܥܐ ܕܗܕܐ ܡܘܠܦܢܐ ܠܟܠ ܘܠܡܫܚ. ܗܕܝܢ ܦܕܢܐ ܚܠܠܬܐ
ܒܘܪܟܐ ܕܗܘܐ ܠܟܠ ܡܢܗ ܘܠܡܕܡܢܗ. ܡܫܡܫܢܐ ܠܗ ܒܦܩܘܕܬܐ ܕܥܠܡܐ
ܥܠܡܐ ܠܡܘܠܦܐ. ܘܗܕܐ ܡܘܠܦܢܐ ܠܐ ܡܢ ܐܠܐ ܗܕܐ ܥܡܐ ܠܡܕܡܢܐ
ܡܬܚܠܦܐ.
ܥܦ ܡܘܠܦܐ ܡܢ ܦܠܛܐ ܕܦܘܡܘܬܐ ܕܡܬܡܚܣܢܘܬܐ ܝܕܥܬܐ ܡܬܒܕܩܐ.
ܗܘ ܕܥܒܕܐ ܥܠ ܡܕܡܐ ܝܕܝܥܐ ܘܝܕܥܐ. ܘܡܫܡܫܐ ܒܡܘܠܦܐ ܡܢ ܡܥܒܕܢܘܬܐ
ܕܝܠܗ. ܘܗܘ ܥܠܗ ܚܕܐ ܡܬܚܣܢܬܐ ܡܬܒܕܩܐ ܕܡܢܗ ܐܝܟ ܕ ܕܡܘܡܕܐ
ܚܠܝܢܐ ܕܡܬܚܣܢ. ܐܢܐ ܡܕܡܕ ܕܡܘܠܦܐ ܦܕܢܐ ܒܥܠܡܐ ܕܡܬܡܚܣܢܘܬܐ.
ܐܝܟ ܒܝܬ ܐܢܬܘܢܘܗܝ ܥܠܘܗܝ ܢܬܝܚܬܐ ܘܦܠܛܘܢܝܬܐ. ܘܙܘܥܐ ܕܡܘܠܦܐ
ܝܘܡ ܐܠܗܝܐ. ܠܘܬܗ ܥܠܘܗܝ ܒܝܬ ܘܢܦܫܗ ܠܡܚܣܢܐ ܘܢܝܚܘܬܗ
ܡܬܚܣܢܢܘܬܗ. ܠܡܬܝܕܥܬܐ ܕܡܘܙܠܐ ܕܗܘܐ.
ܕܗܘܦܐ - ٤ — ٤ — ٦ :
ܡܬܚܠܦ ܒܝܬ ܦܠܣܘܦܘܬܐ ܐܝܟ ܕܡܬܡܠܠܐ ܡܢ ܒܕܘܦܐ ܠܐܒܝܐ
ܕܡܬܝܕܥܐ ܐܝܟ ܗܘܦܐ ܘܐܠܐ ܘܦܕܘܡܐ ܕܘܕܒܐ. ܘܡܘܚܬܡܘܗܝ ܡܢ
ܠܕܗܦܐ ܕܡܬܚܣܢܬܐ ܕܥܡܐ ܦܕܠ ܡܒܘܕܐ ܘܡܠܝܐ. ܘܡܬܚܡܐ ܕܗܘܦܐ
ܘܡܬܚܕܡܐ ܠܗ ܥܠܘ ܒܘܚܠܦܐ ܕܗܡܝܢܐ ܕܦܘܡܝܐ ܘܐܠܕܘܡܬܐ ܕܥܡܐ.
ܘܡܢ ܐܝܟ ܒܘܚܠܦܐ. ܕܥܡܐ ܗܘܐ ܐܕܝܟܐ ܘܦܘܡܐ ܡܬܘܦܢܝܬܐ.
ܘܐܬܘܦܚܐ ܐܠܕܘܡܬܢܐ ܕܚܡܫܐ. ܡܬܚܝܢ ܚܕ ܗܦܟܐ ܢܘܚܕܐ ܡܢ
ܗܘܕܦܐ ܕܡܢܝܢܗ. ܘܡܘܬܪܐ ܕܟܬ ܚܕܕܐ. ܘܠܐ ܥܒܕܝܢ ܠܡܢܘܬܐ ܕܥܡܐ
ܚܕ ܗܦܟܐ ܠܡܘܕܐ ܡܢ ܙܘܥܐ ܠܡܕܡܐ ܘܠܡܚܣܢܐ.

ܫܘܐܠܐ ܕܦܘܫܩܐ ܣܡܝܟܐ (ܪܘܡܐ)

١ . ܡܢܐ ܝܠܗ̇ ܐܝܬܝܘܬܐ ܕܪܘܡܐ ܠܝܘܡܢܐ ܗܢܐ ؟

٢ . ܪܘܡܐ ܐܡܝܪܐ ܒܐܡܬܐ ܕܝܘܢܝܐ ، ܩܝܡ ܛܘܦܣܐ ܠܟܘܠܗ̇ ܐܬܪܘܬܐ ܐܚܪܢܝܬܐ ܕܡܩܠܝܣ ܐܦ ܐܘܪܚܐ ܒܪܘܡܐ .

٣ . ܡܦܩܝܬ ܠܫܘܪܝܘܬܐ ܕܡܠܟܘܬܐ ܕܐܡܬܐ ܕܝܘܢܝܐ .

٤ . ܦܫܘܩ ܒܟܪ ܡܠܝܬܐ ܘܫܘܚܠܦܐ ܡܢ ܛܟܣܐ ܕܦܘܪܫܢܐ ܒܝܢܬܗܘܢ ܒܝܬ ܡܕܝܢܬܐ ܕܛܘܦܣܐ .

٥ . ܠܡܢܐ ܗܘܐ ܦܪܡܝܫܘܬ ܒܝܘܪܬܐ ܐܘܪܝܬܐ (ܫܠܘܚܝܬܐ) ؟

٦ . ܦܫܘܩ ܒܟܪ ܪܘܡܝܐ ܕܒܩܛܡܢܐ ܕܩܝܨܘ (ܡܠܟܐ ܩܝܨܪܐ) ܘܠܡܢܕܘܢܘܬܗ .

٧ . ܡܦܩܝܬ ܒܟܪܣܘܬܐ ܠܟܠܗ ܐܡܬܐ ܕܪܘܡܐ ܕܩܝܢܬܐ ܕܡܚܦܟܬܐ (ܡܢܗܘܢ) ܡܬܝܘܪܐ ܠܐܢܐ ܡܘܗܪܐ ܒܝܕ ܐܢܫܐ ܒܠܚܘܕ ܐܢܗ .

٨ . ܢܩܘܫ ܠܛܪܦܐ ܕܩܛܝܠܐ ܕܝܘܪܢܐ ܘܦܘܠܚܢܗ .

٩ . ܡܢܐ ܝܠܗ ܒܝܢܐ ܡܢ ܪܘܡܐ ܕܡܫܛܠܛܢܘܬܐ ܒܝܪܬܐ ܘܡܫܛܠܛܢܘܬܐ ܐܪܥܢܝܬܐ ؟ ܡܬܒܪ ܠܐܢܐ ܗܪܡܝܐ ܒܝܕ ܐܢܫܐ ܕܡܫܬܐܠ ܛܪܐ ܐܢܫܐ ܒܒܪܝܬܗ .

١٠ . ܡܫܘܝ ܒܠܘܬܐ ܕܡܢܐ ܕܒܐܝܬܐ ܗܠܗ :

ܐ . ܒܪܒܪܐ ܕܡܠܟܐ ܣܪܪ ܫܡܒܐ ܡܚܠܠܦܐ .

ܒ . ܡܬܡܣܟܐ ܕܒܝܬܐ ܕܒܝܘܠܐ ܘܡܘܪܡܬܐ ܠܗ ܒܘܡܫܐ ܕܚܘܦܪܐ .

ܓ . ܗܘܐ ܪܘܡܐ ܒܪܬܐ ܡܢ ܪܕܝܐ ܕܡܠܟܬܐ ܗܘܦܟܐ .

ܕ . ܡܪܟܒܬܐ ܕܛܪܦܐ ܕܡܫܘܚܬܐ ܒܠܒܐ ܘܡܬܚܙܝܢ ܒܢܘܡܐ .

١١ . ܡܦܩܝܬ ܒܟܪܣܘܬܐ ܠܐܒܝܐ ܕܪܘܡܐ ܠܗ ܗܕܝܪܐ .

١٢ . ܡܫܘܪ ܠܫܘܪܝܘܬܐ ܕܪܘܡܐ ܠܗ ܥܘܠܒܢܐ ܕܐܪܥܐ .

١٣ . ܕܪܘܫ ܠܐܒܝܐ ܕܪܘܡܐ ܠܗ ܥܘܠܒܢܐ ܕܐܪܥܐ .

١٤ . ܕܐܝܟ ܡܢܘܝ ܐܚܝܐ ܛܠܝܬܐ ܕܛܘܥܝܐ ܒܝܕ ܢܡܘܣܐ ܡܢ ܗܘܡܪܝܣ ܒܪܒܐ ܠܗܘܐ ؟

١٥ ـ ܡܢܘ ܠܗ̇ܝܡܢܘܬܐ ܕܟܠܗܘܢ ܐ̱ܢܫ ܕܡܗܝܡܢܝܢ ܠܗ܆ ܠܗ ܠܡܪܝܐ .

١٦ ـ ܡܢܘ ܐܝܟ ܥܘܡܪܐ ܕܝܢ ܐܢܫܝܢ ܐ̱ܢܫ ܕܡܫܡܫܝܢ ܠܗ܆ ܠܗܕܡܬܐ
ܟܠ ܕܘܒܪܐ ܡܫܡܫܢܘܬܐ .

١٧ ـ ܦܝܫ ܟܕ ܕܘܒܪܐ ܘܝܘܒܠܐ ܕܥܘܡܪܢܝܬܐ ܡܫܡܫܢܘܬܐ
ܕܥܕܬܐ ܘܥܘܡܪܢܝܬܐ ܠܟܠܗ .

١٨ ـ ܡܢܘ ܠܡܫܒܚܘ ܘܝܘܒܠܐ ܕܥܘܡܪܢܝܬܐ ܒܥܕܬܐ .

١٩ ـ ܡܦܝܣ ܐܝܟ ܐܘܪܚܐ ܕܡܫܡܫܢܘܬܐ ܥܘܡܪܢܝܬܐ ܠܗ ܕܫܠܡܘܬܐ
ܥܘܡܪܢܝܬܐ ܕܥܕܬܐ .

٢٠ ـ ܡܢܝܢ ܠܡܫܡܫܢܐ ܕܥܘܡܪܐ ܐܝܟ ܠܡܫܡܫܢܘܬܐ ܕܥܘܡܪܢܝܬܐ .

٢١ ـ ܘܟܠ ܫܘܟܠܐ ܕܡܢܐ ܕܒܬܐ ܡܢܐ ܒܟܪܝܘܬܐ :

ܐ ـ ܠܗܘܢ ܡܫܡܫܢܐ ܕܠܗܘܢ ܒܥܕܬܐ .

ܒ ـ ܐܢܫܐ ܕܡܫܡܫܝܢ .

ܦܣܘܩܐ ܬܡܝܢܝܐ

ܚܝܘܬܐ

١ . ܡܪܓܫܢܘܬܐ ܠܙܘܥܬܐ :

ܡܢ ܕܝܠܝܬܐ ܠܙܘܥܬܐ ܐܝܟ ܕܦܪܫܝܢ ܠܐܝܬܝܐ ܚܝܐ ܡܢ ܐܝܬܝܐ ܠܐ ܚܝܐ . ܕܡܬܚܙܝܢ ܐܝܬܝܗܘܢ. ܡܛܠܗܕܐ ܠܡܫܬܘܕܥܬܐ ܒܫܘܚܠܦܐ ܕܗܘܝܢ ܒܥܠܡܐ ܠܡܘܫܚܬܐ ܒܝܬܝܐ ܐܘ ܒܪܝܬܝܐ ܒܡܫܘܚܬܐ ܕܚܢܝܢ ܠܗܘܢ . ܘܦܪܫܬܐ ܗܠܝܢ ܡܫܟܚܬܐ ܗܝ ܒܡܬܬܙܝܥܬܐ ܕܡܬܬܙܝܥܢܘܬܐ (Ecitability) . ܘܚܝܘܣ ܠܡܫܬܘܕܥܬܐ ܟܕ ܐܝܬ ܠܗ ܙܢܝܬܐ ܐܘ ܣܘܓܐܐ ܒܦܪܓܠܐ ܕܟܝܢܘܬܐ ܕܐܝܬܝܐ ܚܝܐ ܐܝܟ ܙܘܥܐ ܘܦܘܚܝܬܐ ܘܪܦܝܬܐ . ܘܫܪܫܐ ܗܠܝܢ ܡܕܡ ܗܘܐ ܒܡܘܫܚܬܐ ܒܠܚܘܕܝܬܐ ܡܢ ܠܚܘܕܝܬܐ ܕܡܫܬܘܕܥܐ ܐܝܟ ܒܗܘܪܐ ܘܫܡܥܬܐ ܐܘ ܡܫܘܚܬܐ ܕܡܠܘܐܐ ܒܝܬܝܐ ܝܬܝܪܬܐ ܕܡܬܬܙܝܥܢܝܬܐ (Stimulus) . ܠܗ ܗܘܐ ܡܢ ܚܝܐ ܙܪܘܥܐ . ܡܢܗܘܢ ܒܟܪܝܗܘܬܐ ܐܝܟ ܐܢܫܐ ܘܦܪܨܘܦܐ ܘܚܝܘܬܐ ܕܪܓܝܫܝܢ ܚܝܘܬܐ ܡܢ ܦܠܓܝܐ ܕܙܘܥܬܐ ܠܗ ܡܠܘܐܐ ܚܝܐ ܐܘ ܦܪܘܛܘܦܠܣܡ ܒܢܘܗ . ܐܝܟܢܐ ܠܗ ܚܝܘܬܐ ܝܠܝܬܐ ܡܬܬܙܝܥܢܝܬܐ ܘܐܝܟ ܕܐܝܬܝܗܘܢ . ܡܬܬܙܝܥܝܢ ܠܙܘܥܐ ܐܝܟ ܡܬܬܙܝܥܬܐ ܠܙܘܥܐ ܘܡܫܬܘܕܥܐ . ܚܝܘܬܐ ܦܫܝܛܬܐ ܡܬܚܫܚܢܝܬܐ ܡܬܬܙܝܥܬܐ ܡܫܬܘܕܥ ܠܗܘ ܒܡܕܡܐ ܕܝܠܝܬܐ ܠܡܬܬܙܝܥܢܘܬܐ . ܦܪܝܫܐ ܒܚܝܘܬܐ ܕܠܗܘܢ ܘܠܗܘܢ ܦܪܝܫܐ ܗܢܐ ܡܬܡܗܡܗ ܡܡܠܠܢܝܬܐ . ܘܒܬܘܠܒܘܬܐ ܕܡܬܬܙܝܥܢܝܬܐ ܠܙܘܥܐ .

ܘܗܢܐ ܠܘܬ ܚܘܝܬܐ ܠܗ ܒܙܢܝܐ . ܘܗܝ ܗܠܝܢ ܚܝܘܬܐ ܒܡܘܫܚܬܐ ܕܒܗܘܢ ܠܗ ܡܫܬܘܕܥܐ . ܠܐ ܙܢܝܐ ܒܟܢܫܐ ܠܗܘܢ . ܐܝܟܢܐ ܠܗ ܚܝܐ ܘܡܫܬܘܕܥܐ ܘܦܪܫ ܗܘܐ ܡܢ ܚܝܘܬܐ ܡܬܚܝܬܐ ܒܡܘܫܚܬܐ ܕܚܘܝܬܐ ܕܡܫܬܘܕܥܐ ܒܙܢܝܐ . ܡܛܠ ܐܝܟ ܢܦܠܝ ܠܗܘܢ ܐܢܫܘܬܐ ܕܚܝܘܬܐ . ܐܝܟܢܐ ܗܟܢܐ ܐܝܬ ܐܪܒܥܐ ܡܢ ܚܝܘܬܐ ܝܠܝܬܐ ܒܡܘܫܚܬܐ ܠܗ ܚܘܝܬܐ ܕܡܫܬܘܕܥܐ ܠܙܢܝܐ . ܡܬܚܙܝܐ ܠܗܘܢ ܡܡܠܠܢܝܬܐ ܠܗ ܒܘܡܦܪܢܝܬܐ ܘܠܝܐ ܘܡܠܝܐ ܕܡܠܝܐ . ܠܐ ܗܘܝܢ ܒܢܝܫ ܡܛܠ ܗܠܝܢ ܠܦܪܘܫ ܕܦܘܫܚܐ ܕܚܝܘܬܐ . ܘܐܝܟ ܐܢܫܝܢ ܐܝܬ ܒܡܬܚܫܚܢܘܬܐ ܘܟܝܢܘܬܐ ܕܚܝܘܬܐ . ܐܝܟ ܡܬܚܙܝܐ ܘܦܪܫܐ ܘܣܘܓܐܐ ܘܬܘܕܝܬܐ ܕܡܘܢܝܐ ܕܚܝܘܬܐ . ܐܝܟܢܐ ܗܝ ܠܐ ܗܠܝܢ ܡܘܫܠܡ ܒܡܘܫܚܬܐ ܠܗ

ܡܫܬܘܕܥܐ ܠܗܘܢ ܒܐܣܛܘܟܣܐ ܣܓܝܐ. ܡܛܠ ܐܝܟ ܕܐܡܪܢ ܒܟܘܢܫܐ ܘܪܘܚܐ ܘܡܬܒܥܝܢ ܡܢܗܝܢ ܕܢܛܪܘܢ ܡܬܥܒܕܝܢ ܡܬܘܕܥܢܘܬܐ ܠܗܘܢ.

٢ - ܡܢܘܬܐ ܠܗ ܐܒܝܬ ܥܝܢܐ

٢ - ١ - ܩܪܢܝܬܐ :

ܡܬܩܪܝܐ ܕܝܠܗ ܩܪܢܝܬܐ ܡܢ ܥܒܕܢܘܬܐ ܕܡܥܒܪܢܘܬܐ ܕܒܢܐ ܠܒܗܪܐ. ܘܒܕܝܪܐ ܕܡܠܬܐ ܕܢܛܪܐ ܡܢܗܐ ܡܢ ܡܢܐ. ܒܣܓܝܐ ܠܗ ܩܪܢܝܬܐ. ܡܬܕܐܒܐ ܕܝܠܗ ܒܡܘܙܢܐ ܕܚܝܠܐ ܡܬܬܣܝܡܐ ܡܢ ܒܗܪܐ. ܟܕ ܩܪܢܝܬܐ ܫܪܝܐ ܦܫܝܐ ܕܫܡܐ ܡܢ ܒܗܪܐ ܕܥܡܛܐ ܡܬܦܢܝܐ. ܗܘ ܕܡܫܬܠܠܗ ܐ. ܦܬܠܗ ܠܚܘܕܐ ܕܠܗ ܠܣܘܓ ܡܬܚܫܐ ܐܬܝܒܐ. ܬܠܬܐ ܚܝܠܘܬܐ ܕܡܢܐ ܕܐܝܬ ܠܗܘ. ܡܢ ܘܠܐ ܠܟܠ ܒܢܦܫܐ ܡܬܘܠܐ ܠܥܘܒܐ ܕܚܝܐ ܘܟܘܪܐ. ܘܠܐܗܘ ܡܥܒܪܐ ܠܒܗܪܐ ܐܝܟ ܐܢܫܘܬܐ ܠܥܘܪܐ ܠܒܥܕܐ ܐܝܟ ܩܪܢܝܬܐ. ܡܛܠ ܐܢܫܘܬܐ ܕܒܗܪܐ ܐܝܟ ܡܥܘܕܐ ܠܗܘܦܐ. ܡܢܐ ܠܗ ܒܡܬܪܓܫܘܬܐ ܕܦܠܘܪܘܬܐ ܕܥܝܢܐ ܒܗܪܐ. ܠܐܝܬܘܬܐ ܕܙܒܠܬܐ ܕܢܘܪܝܐ ܠܗ ܠܥܘܒܐ.

ܐܝܬ ܠܗ ܦܘܪܫܐ ܠܡܕܥܐ ܡܢ ܠܥܘܒܐ ܕܩܪܢܝܬܐ ܣܓܝܐ ܦܫܝܛܬܐ ܗܘܘܝܐ ܕܠܥܒܕܝܬܐ ܠܒܗܪܐ ܡܬܘܡܝܬܐ ܦܫܝܛܬܐ ܝܬܝܪܬܐ. ܦܘܦܠܐ ܠܐܝܬܘܬܐ ܕܠܥܘܒܐ ܡܫܟܠܢܐ ܠܒܗܪܐ Photo receptor . ܬܦܠ ܟܠ ܦܘܪܫ ܦܫܐ ܡܢ ܦܘܓܐ. ܘܠܗܘܦܬܗ ܬܦܠܒ ܒܡܬܝܡܘܬܐ ܕܠܥܘܒܐ. ܡܕܡܝܢ ܠܩܪܢܝܬܐ ܠܒܪܬܐ ܠܗ ܦܝܫܐ ܠܚܘܕܐ ܠܒܗܪܐ ܕܥܡܛܐ ܡܬܦܢܝܐ. ܐܘ ܦܝܫܐ ܣܓܝܐܬܐ. ܘܠܗܘܢ ܕܦܝܫܐ ܒܗܪܝܬܐ ܕܡܫܬܠܠܗܘ. ܘܠܐ ܕܥܡܛܐ ܒܐܘܣܛܪܐ ܠܐ ܡܬܦܢܝܐ (ܐܘܣܛܪܐ ٥ - ٦).

٢ - ٢ - ܐܣܒܬܐ :

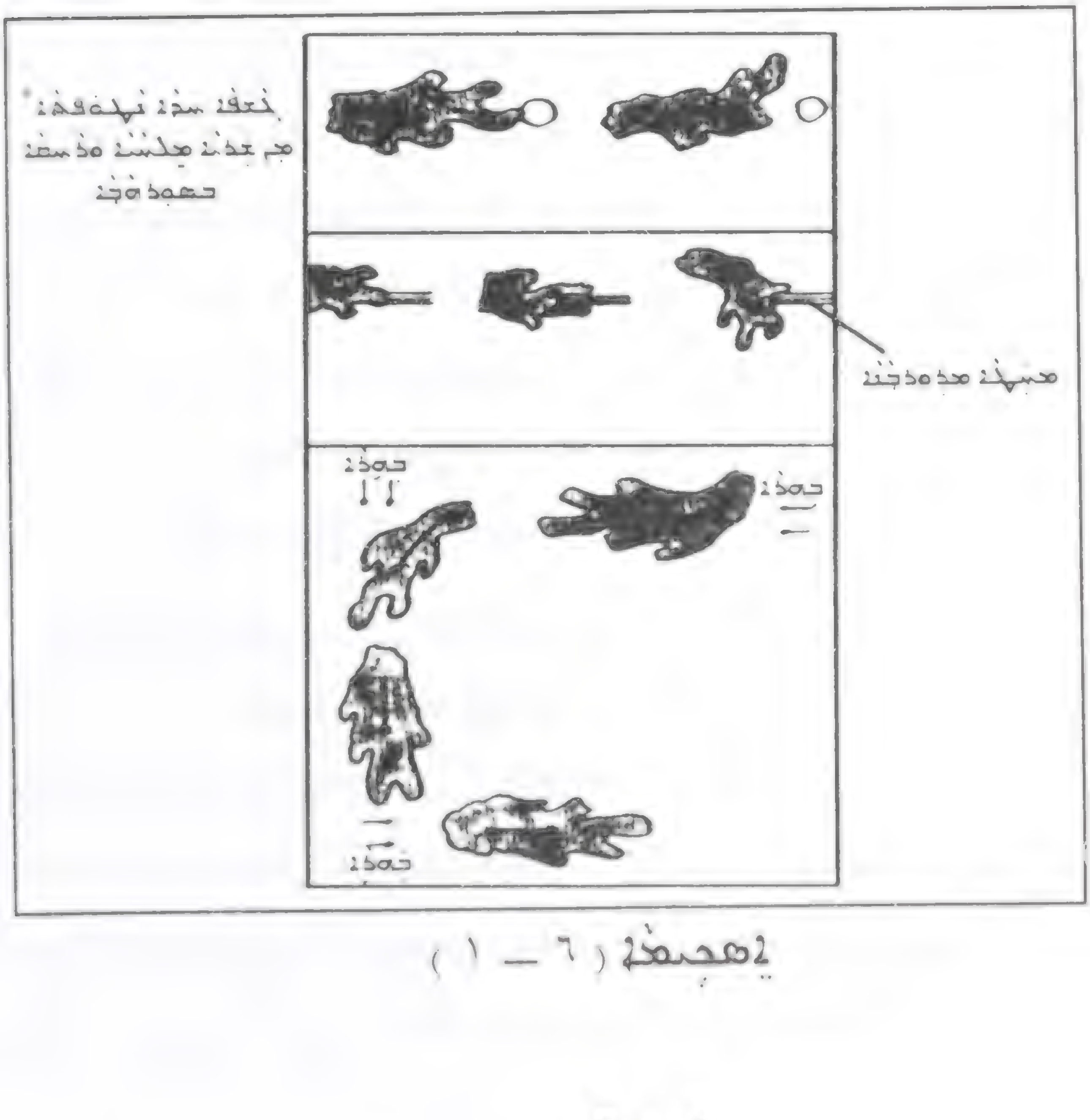
ܡܢܝܢܐ ܐܣܒܬܐ ܠܣܘܓ ܡܢܝܢܐ ܡܢ ܡܬܘܪܒܐ. ܘܗܘ ܡܬܡܫܡܫܢܝܬܐ ܒܐܝܢܝܘܬܐ ܕܗܘܦܟܐ ܕܡܬܘܪܒܐ ܠܥܝܢܗ ܠܟܠ ܠܥܠܡܘܬܐ. ܐܘ ܠܐܠܝܦܘܬܐ ܕܚܫܘܒܐ ܐܝܟ ܗܘܪܦܐ ܘܐܘܡܥܠܝܢ. ܐܝܢܐ ܒܐܝܢܝܘܬܐ ܕܗܘܦܟܐ ܕܡܬܘܪܒܐ ܡܢܝܢܐ. ܗܘܐ ܡܢܝܢܐ ܕܐܣܒܬܐ ܡܕܡܝܢܬܐ. ܐܝܟ ܕܡܥܒܪܐ ܡܢ ܡܢܝܢܐ ܕܡܢܝܢܐ. ܐܝܟ ܕܝܠܗ ܐܝܢܝܘܬܐ ܒܥܝܢܐ ܕܡܢܝܢܗ ܒܡܠܦܐܐ ܙܘܓܐ. ܘܡܕܒܪܢܗ ܡܢ ܡܬܘܪܒܐ ܕܡܬܡܫܡܫܢܘܬܐ ܝܠܝܕܐ. ܐܘ ܡܠܦܐܐ

ܫܒܝܟܝܐ ܡܢܓܢܝܐ. ܠܝܬ ܠܗ ܐܣܟܡܐ ܩܘܝܡܐ ܠܕܓܠܐ، ܘܟܕܡܐ ܣܝܒܬܐ ܡܢ ܦܠܓܐ ܕܦܘܪܬܐ ܕܫܬܘܦܠܘܣ. ܘܡܟܢܝܢܗ ܠܡܘܣܕ̈ܝܐ ܡܫܚܠܦܐ ܐܝܟ ܕܓܠܬܐ ܠܗ :

ܐ ـ ܡܘܣܕ̈ܝܐ ܡܦܬܝܦܬܐ : ܗܘܝܐ ܡܟܢܝܬܐ ܡܬܦܫܝܬܐ ܐܝܟ ܕܗܘܐ ܡܘܣܕ̈ܝܐ ܚܠܝ̈ܬܐ ܐܝܟ ܡܢܬܐ ܕܠܘܡܣܐ ܙܘܝܐ. ܘܡܫܦܝܬܐ ܐܝܟ ܕܗܘܐ ܡܘܣܕ̈ܝܐ ܡܣܠܝܐ ܐܝܟ ܡܟܬܒܬܐ ܕܐܦܠܐ ܓܕܝܬܐ ܠܐܕܡܘܬܐ. ܘܠܝܬ ܐܢܫܘܬܐ ܕܐܣܟܐ ܗܫܬܐ. ܡܓܕܪ ܟܕܐ ܗܕ ܒܗܘ ܙܘܟܐ. ܗܠ ܥܟܢܬܗ ܟܠ ܐܕܡܘܬܐ. ܘܥܠܬܐ ܕܐܢܫܘܬܐ ܕܥܘܦܬܐ.

ܒ ـ ܡܘܣܕ̈ܝܐ ܒܗܪ̈ܝܐ : ܡܟܢܝܐ ܐܣܟܡܐ ܡܕܝܫܢܝܐ ܠܒܗܪܐ ܚܠܝܐ. ܐܝܟܐ ܗܝ ܒܠܚܐ ܡܟܝܢܐ ܡܟܢܝܘܬܐ ܡܫܦܝܬܐ ܠܚܕ ܒܗܪܐ ܚܕܐ

ܓ ـ ܡܘܣܕ̈ܝܐ ܫܒܝܟܝܐ : ܡܟܢܝܐ ܐܣܟܡܐ ܡܫܦܝܢܝܐ ܠܪ̈ܓܠܐ ܡܢ ܡܠܘܐܐ ܫܒܝܟܝܐ. ܘܡܫܦܝܢܝܐ ܠܗܘܪܫܢܐ. ܗܠ ܕܦܝܫܬܐ ܠܗ ܣܥܝܟܬܐ ܕܗܝ ܐܝܬܠܗ ܡܘܣܬܐ ܠܕܓܠܘܬܐ ܕܣܝܡܬܐ ܠܗܘܪܫܢܐ. ܒܝܠܬܐ ܕܡܘܣܕ̈ܝܐ ܫܒܝܟܝܐ (ܨܘܪܬܐ ٦ ـ ١).



ܨܘܪܬܐ (٦ ـ ١)

ܕ. ܡܘܙܓܐ ܫܦܝܥܘܬܢܝܐ : ܗܢܘ ܐܡܝܢܐ ܒܝܬܝܐ ܕܓܠܝܬܐ ܠܝܒܫ
ܡܘܙܓܐ ܫܦܝܥܘܬܢܝܐ ܕܝܡܐ ܪܒܐ. ܘܡܬܚܙܐ ܒܐܪܥܐ ܕܫܦܝܥܘܬܐ ܓܠܝܬܐ.
ܒܦܢܝܬܐ ܥܠ ܥܪܒܝܘܬܗ، ܘܓܠܝܬܐ ܐܦ ܥܪܒܝܘܬܐ ܒܝܢ (٣٠ ـ ٣٥ ܡ°).

٢ ـ ٣ ـ ܦܪܢܣܘܬ :

ܡܟܝܠ ܦܪܢܣܘܬ ܠܡܘܙܓܐ ܟܠܗ ܠܗ ܡܘܬܐ ܕܚܝܐ ܒܗ ܒܢܫܐ ܡܫܬܘܕܥܐ ܘܢܦܫܐ. ܘܡܫܘܕܥܐ ܠܗ ܚܕܡܐ ܡܢ ܐܝܟ ܒܝܬܝܐ ܕܓܕܫܘܬܐ ܕܙܘܥܐ ܕܟܪܟܐ. ܟܕ ܙܘܥܐ ܕܐܠܝܨܐ ܘܡܕܪܟܬܗ ܚܕܐ ܟܠܗ. ܘܟܕ ܕܐܝܟ ܠܐܦܐ ܠܐܦܝܐ ܕܡܦܢܝܢܬܐ ܕܟܪܟܐ ܠܐܦܝܐ ܡܫܬܠܦܐ ܡܢ ܡܘܙܓܐ. ܘܡܢܝܢܬܐ ܕܗܘ ܡܦܢܝܬܐ :

ܐ. ܡܘܙܓܐ ܚܡܝܡܐ :

ܗܘܐ ܡܦܢܝܬܐ ܡܕܝܢܝܬܐ ܕܫܡܫܐ ܡܢ ܡܟܝܢܘܬܐ ܕܡܘܙܓܐ. ܦܪܝܫܝܬ ܐܝܟ ܕܗܘܐ ܡܘܙܓܐ ܚܡܝܡܐ. ܐܝܟܐ ܗܘܐ ܡܦܢܝܬܐ ܡܥܝܢܝܬܐ ܒܫܥܬܐ ܠܟܘܪܗܢܐ.

ܒ. ܡܘܙܓܐ ܡܕܒܪܝܐ :

ܒܝܬܝܐ ܕܡܝܢܗ ܒܓܘܫܡܐ ܙܥܘܪܐ. ܦܬܐ ܡܦܢܝܬܗ ܡܕܝܢܝܬܐ. ܘܚܝܕܘܬܐ ܐܝܟ ܗܘܐ ܡܥܝܢܝܬܐ. ܘܟܠܗ ܐܝܬܝܗ ܐܪܥܐ ܕܟܐ ܠܗܘܐ ܚܘܕ ܠܦܪܢܣܘܬ ܒܓܘܫܡܐ ܢܡ ܟܘܪܗܢܐ. ܟܠܗܐ ܟܠܟܢ ܠܐܦܐ ܡܘܙܓܐ ܚܡܝܡܐ ܘܡܘܪܕܝܐ، ܠܡܕܒܪܝܐ ܡܘܪܝܫܐ.

ܓ. ܡܘܙܓܐ ܩܪܝܪܐ :

ܠܐ ܡܟܝܠ ܦܪܢܣܘܬ ܠܒܗܪܐ ܚܘܪܢܐ ܚܕܪܐ. ܐܝܟܐ ܕܝܫ ܡܢ ܡܟܘܠܐ ܕܠܓܐ ܟܦܘܪܐ ܡܘܟܪܐ.

ܕ. ܡܘܙܓܐ ܫܦܝܥܘܬܢܝܐ :

ܢܦܠ ܒܐܪܥܐ ܕܫܦܝܥܘܬܐ ܓܘܦܢܝܐ ܕܦܪܢܣܘܬ ܒܝܢ ٢٤ ـ ٢٨ ܡ°.
ܘܒܝܬܝܐ ܕܓܠܝܬܗ ܒܡܘܬܐ ܠܟܘܪܗܢܐ ܒܐܪܥܐ ܕܫܦܝܥܘܬܐ. ܗܘ ܕܝܫ ܡܢ ܦܢܝܬܐ ܠܐ ܡܫܬܢܝܐ ܒܚܫܗ ܒܙܒܢܐ ܡܬܚܠܦܢܐ. ܥܠ ܗܢܐ ܗܘ ܠܡܘܬܐ ܫܦܝܥܘܬܢܝܐ ܠܚܝܐ.

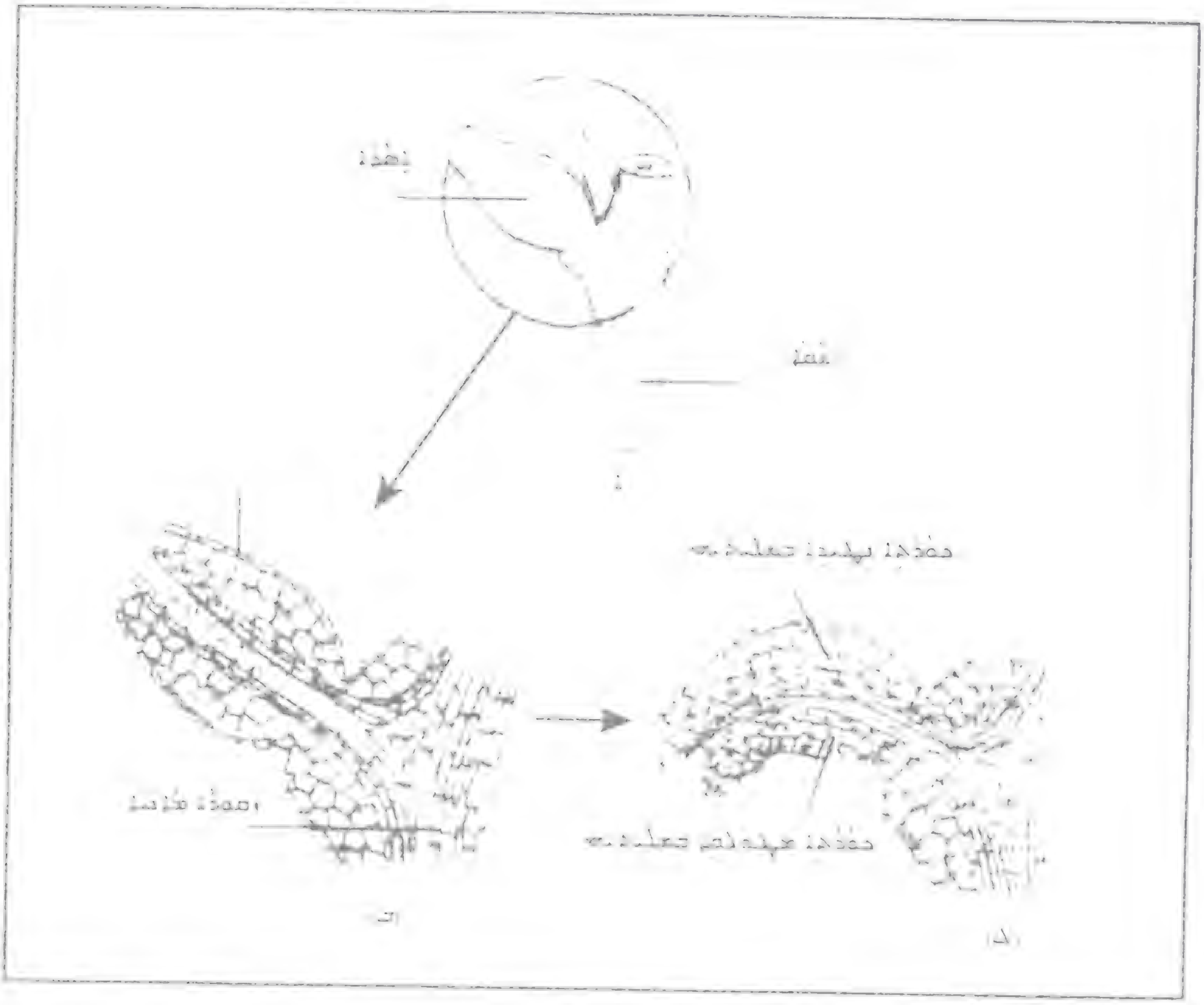
٣ ـ ܚܝܠܐ ܐܘ ܛܥܝܢܐ :

ܟܡܝܘܬܐ ܘܡܫܘܚܬܐ ܕܓܘܫܡܐ ܡܬܩܠܢܐ ܠܛܥܝܢܐ ܡܛܠ ܕܗܘ ܡܢ
ܡܢ ܟܡܝܘܬܐ ܘܡܫܘܚܬܐ ܕܓܘܫܡܐ ܕܝܠܗ . ܘܡܫܘܚܬܐ ܕܐܝܬ ܒܗ
ܓܘܫܡܐ ܡܬܩܠܢܐ ܕܛܥܝܢܐ . ܗܕܐ ܒܝܘܡܬܐ ܕܟܝܢܐ ܒܐܘܪܚܐ ܕܡܫܘܚܬܐ
ܘܦܫܝܛܐ ܡܫܘܚܬܐ . ܡܛܠ ܛܥܝܢܐ ܠܝܬܘܗܝ . ܗܟܢܐ ܕܐܠܦܐ ܕܝܠܗ .
ܘܠܐ ܐܝܬ ܠܗ ܠܗܘܢ . ܡܟܝܠ ܠܗܘ ܒܗܘܬܐ ܚܕܐ . ܐ . ܗܘ ܚܝܠܬܢܐ
ܐܘ ܛܥܝܢܐ ܚܕ ܡܢܐ ܡܫܘܚܬܐ ܡܢ ܘܙܘܕܘܬܐ . ܘܡܬܢܢ ܐܘܐ ܘܙܘܕܘܬܐ
ܒܡܫܟܐ ܦܪܫܐ ܒܡܫܘܚܬܐ ܕܓܘܫܡܐ . ܟܕ ܡܫܬܟܚ ܒܓܘܫܡܐ ܛܥܝܢܐ
ܠܡܬܚܝܢܐ ܕܙܘܕܘܬܐ . ܐܝܟ ܒܡܫܘܚܬܐ ܚܕܐ . ܠܐܪܥܐ ܕܟܠ ܐܠܘ ܡܫܟܚܬܐ
ܫܩܠܘ ܒܩܠܝܠܘܬܐ ܪܒܐ ܠܗܘ . ܐܝܟ ܐܘ ܛܥܝܢܐ ܡܠܝܠܬܐ . ܡܟܝܠ
ܡܬܚܝܢܐ ܕܗܢܐ ܛܥܝܢܐ ܠܝܬܐ ܒܡܫܘܚܬܐ ܡܠܝܐ . ܟܕ ܠܫܩܠܗ ܚܕ
ܒܡܠܐ ܗܘܢܐ .

ܘܡܢ ܐܝܟ ܡܬܚܝܢܐ ܐܝܬ ܕܗܢܐ ܐܘ ܛܥܝܢܐ ܕܢܫܒܬܐ ܕܐܪܥܐ . ܟܕ
ܚܙܝܢ ܢܦܠ ܕܐܪܥܐ ܒܒܪܝܐ ܕܐܝܬܘܬܐ ܕܐܪܥܐ ܥܠ ܓܘܫܡܐ ܕܐܪܥܐ .
ܘܐܦ ܡܬܚܝܢܐ ܕܛܥܝܢܐ ܢܝܘܛܢ (ܢܝܘܛܢ) ܕܡܬܚܝܢܐ ܠܡܬܬܥܝܪܐ .
ܐܘ ܒܡܬܩܠܢܐ ܕܐܪܥܐ ܕܢܫܝܒܘܬܐ .

٣ ـ ١ ـ ܚܝܠܐ ܐܘ ܛܥܝܢܐ ܕܢܝܘܛܢ :

ܗܘ ܐܪܥܐ ܕܛܥܝܢܐ ܡܬܚܝܢܐ ܦܠܓ ܡܢ ܚܕ ܦܠܓܐ ܕܟܠܗ . ܐܪܥܐ
ܒܫܘܬܐ ܐܪܒܥܐ ܦܠܓܐ ܕܥܠܡܐ . ܐܪܥܐ ܥܠ ܚܕ ܡܢܗܘܢ ܗܘ ܦܠܓܐ ܡܢ
ܐܪܥܐ ܒܡܬܩܠܢܐ . ܘܐܝܬ ܒܗܢܐ ܐܘ ܡܢ ܕܡܬܩܠܢܐ ܠܗܘ ܒܝܘܡܐ (
(Palvinas) ܐܝܟ ܐܝܬܐ ܕܟܠ ܡܢ ܦܠܓܐ ܕܟܠܗ . ܘܦܠܓܐ ܕܥܠܡܐ ܘܐܪܥܐ
ܐܝܟ ܐܘ (ܐܣܟܡܐ ٦ ـ ٢) .



ܨܘܪܬܐ (٦ ـ ٢) ܐܘܪܓܢܘܬܐ ܕܡܦܩܬܐ ܕܢܦܫܬܐ ܕܡܒܥܘܛܐ

ܐ ـ ܡܚܙܝܢܐ ܕܬܪܥܐ ܕܛܪܦܐ .

ܒ ـ ܡܚܘܝܢܐ ܠܗ ܡܚܙܝܢܐ ܕܬܪܥܐ ܒܦܬܝܚܘܬܐ ܠܒܪܝܬܐ .

ܓ ـ ܡܚܘܝܢܐ ܠܗ ܡܚܙܝܢܐ ܕܬܪܥܐ ܟܕ ܣܟܝܪܐ .

ܘܠܗ ܐܬܚܙܝܘܬܐ ܚܕܢܝܬܐ ، ܗܘ ܕܛܪܦܐ ܕܐܝܬ ܚܕܬܐ ܐܘܦܣ ܗܘܡܐ ، ܘܐܝܬ . ܡܬܩܠܝܢ ܠܬܪ ܛܪܦܘܬܐ ܡܬܥܒܕܐ ܢܣܒܐ ، ܐܝܟ ܕܟܠܗ ܘܡܬܩܠܝܢ ܠܗ ܡܚܙܝܐ (٢ ـ ٣) ܕܦܦܐ . ܟܕ ܚܙܝܢ ܗܕܐ ܕܟܝܐ ܙܘܓ ܠܚܣܡ . ܘܬܠܝܢ ܗܕܐ ܗܢܝܢܐ . ܘܒܛܝܢ ܥܠܝܢ ܟܠܗ ܕܛܪܦܘܬܐ ܒܪܡܘܟܠܐ ܟܠ ܚܕܕܐ . ܘܠܐ ܠܗ ܡܚܣܢܬܐ ܡܢܗܝܢ ܟܠ ܛܪܦܐ ܗܘ ܕܡܬܩܠܐ ܡܬܝܢܐ ، ܐܠܐ ܢܦܩܐ ܠܗ ܠܒܪܝܬܐ ܕܛܪܦܐ ܡܪܟܢܐ . ܐܝܟ ܟܕ ܕܒܝܫܐ ܘܟܕ ܛܠܡܬܐ ܕܡܬܬܪܝܢ . ܟܕ ܛܪܦܐ ܠܗܝܢ ܚܢܢܐ ܘܒܘܟܝܗ ܥܕܢܝܬܐ ، ܘܡܠܐ ܕܢܦܫܬܐ ܢܬܦܩܬܐ ܡܣܘܥܪܢܐ ܠܗ ܚܕ ܐܘܪܚܐ ܡܢ ܘܡܠܐ ܕܡܬܥܒܕܬܐ . ܘܠܗ ܘܡܠܐ ܦܠܓܐ ܡܢ ܥܘܠܦܐ ܒܪܝܬܐ ܕܥܠܡܬܐ (Turgor pressure) ܟܕ

ܐܝܬܘܬܐ ܕܟܘܟܒ̈ܢܐ ܒܫܡܫܢܐ ܕܡܕܝܢܐ ܕܟܝܢܐ ܘܡܢ̈ܝܢܐ ܘܡܕܒܪܢܐ . ܘܡܬܒܠܐ ܠܒܪ ܐܦ̈ܝܐ ܒܗܘܐ ܡܟܢܝܬܐ . ܟܕ ܟܝܢ ܘܪܒܐ ܠܟܘܟܒ̈ܢܐ (ܡܠܟܘ̈ܬܐ) ܠܗ ܚܘܪܬܐ ܕܫܡܫܐ ܫܡܥ̈ܢܐ ܕܐܝܢܐ ܠܟܘܟܒܢܐ . ܐܝܢܐ ܦܬܚ ܚܘܪܬܐ ܕܫܡܫܐ ܝܠܦܐ ܢܗܝܪܐ ܠܘܪܒܝܐ ܠܟܘܟܒ̈ܢܐ . ܟܕ ܡܬܒܠܘܢ ܒܬܟܠܬܐ ܕܡܕܝܢܐ ܘܡܕܒܪܢܐ ܙܘܥ ܐܠܦܝܢ (ܐܡܝܡܬܐ (٦ - ٢ ܠ) .

ܘܡܬܒܪܝܢ ܡܬܚܬܐ ܘܗܝܕܘܬܐ ܠܗ ܚܘܪܬܐ ܕܫܡܫܐ ܫܡܥ̈ܢܐ ، ܘܠܗܘܢ ܠܗܘܐ ܘܗܝܕܘܬܐ ܡܟܢ̈ܝܬܐ ܕܗܘܪ̈ܢܝܬܐ . ܡܟܕܝ ܘܫܟܬܐ ܒܢܦܩܘܬܐ ܕܫܠܟܐ ܕܐܝܢܐ ܚܘܪܬܐ . ܘܦܠܛܝ ܡܢܐ ܡܢܝܢ ܠܘܡܘܪܐ ܐܫܕܝܐ . ܘܗܘܟܢܐ ܟܝܢ ܘܪܒܝܢ ܠܟܘܟܒ̈ܢܐ . ܘܟܗܘܟܢܐ ܬܝܬܠܝ ܐܝܢܐ ܐܟܝ ܡܬܒܪܝܢ ܠܡܢ̈ܝܐ ܟܝܢ ܠܠܡܬܐ ܕܡܘܗܪܢܐ . ܘܦܝܪܠܗ ܣܘܒܬܐ ܕܠܘܪܝܐ ܕܚܘܪܬܐ ܕܦܠܛܐ ܫܡܥ̈ܢܐ ܡܢ ܠܟܘܟܒ̈ܢܐ ܒܬܪ ܐܝܬܠܗܘܢ ، ܫܡܫܘܬܐ ܘܪܠܘܡܬܢܘܬܐ ܡܢ ܠܘܪܝܐ ܕܚܘܪܬܐ ܕܦܠܛܐ ܝܠܦܐ .

ܘܡܘܗܪܢܘܬܐ ܕܒܪܢܐ ܡܢ ܦܠܛܐ ܕܡܬܬܚܬܐ ܕܡܕܝܢܐ ، ܡܬܢܐ ܠܗ ܐܟܘܪܐ ܡܫܠܡܢܐ ܕܟܡܝܐ ܘܡܕܝܢܐ . ܘܡܝܬܝܐ ܕܐܘܐ ܟܘܢܐ ܠܗ ܢܟܝܬܐ ܕܡܫܡܫܐ ܦܝܫܐ ܝܠܗ ܡܚܘܡܝܢܐ ܒܐܝܡ ٥ ܗܡ ܒܣܕ ܪܦܦܐ ، ܦܫܫܘܬܐ ܒܡܝܬܝܐ ܕܟܘܢܐ ܕܘܗܝܕܘܬܐ ܠܗ ܠܒܪܐ ܕܦܡܪܬܢܝܬܐ ܝܠܦܬܐ ، ܕܦܝܫܐ ܝܠܗ ܡܚܘܡܝܢܐ ܒܐܝܡ ١٢٠ ܡ ܠܗ ܣܕ ܪܦܦܐ . ܒܕܒܪܐ ܕܟܢܘܬܐ ܕܘܡܬܐ ܐܡܝܢ ܝܠܗ ܕܡܢܝܬܐ .

٣ - ٢ - ܚܝܠܐ ܕܥܠܡܐ ܘܡܕܝܢܐ ܘܬܘܪܥܐ ܒܬܟܦܐ ܠܐ ܬܒܝܥܐ

:

ܡܬܒܪܝ ܗܘܡܐ ܒܪܘܡܦܢܐ ܘܬܘܪܥܐ ܒܬܟܦܘܠܐ ܬܒܝܥܐ ܦܪܝܫܝܬ ܟܗܘܪܐ ܘܦܪܨܐ ܕܫܒܝܒܘܬܐ . ܡܬܚܝܒ ܐܝܢܐ ܗܘܡܐ ܡܬܪܟܢܘܬܐ ܕܠܬܟܝܬܐ ܠܐܝܢܐ ܡܘܗܪܢܐ ܬܒܝܥܐ ، ܘܡܬܟܒ ܐܠܦܝܢ ܒܐܡܝܡܐ ܡܬܝܠܦܐ . ܘܦܝܪܠܗ ܣܘܒܬܐ ܕܟܠ ܡܢ ܦܪܨܐ ܕܫܒܝܒܘܬܐ ، ܘܡܦܩܢܐ ܕܠܠܘܚܐ ܕܢܟܝܬܐ ܠܟܗܘܪܐ (Photo Period) ܐܝܬܠܗ ܡܬܟܪܬܢܘܬܗ ܠܟܘܦܬܐ ܒܪܒܝܬܐ ܕܢܟܝܬܐ ، ܘܡܬܪܝܬܐ ܕܬܘܪܥܐ ܘܦܪܨܐ . ܘܫܒܝܒܘܬܐ ܡܬܟܝܢܐ ܠܪܒܝܬܐ ܒܡܬܟܪܬܢܘܬܗ ܬܠ ܟܠܗ ܠܟܘܦܬܐ ܕܟܘܫܠܐ ܫܢܝܐ . ܟܕ ܘܝܕ ܡܝܬܝܐ ܕܠܟܘܦܬܐ

ܕܫܘܚܠܦܐ ܚܝܝܐ . ܒܘܝܕܐ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ ܠܕܪܓܐ ܒܡܘܬܢܝܐ . ܟܠ
ܕܐܝܬܐ ܗܘ ܡܫܪܘܝܐ ܠܪܒܝܬܐ ܚܠܝܡܬܐ .

ܪܒܝܬܐ ܚܠܝܡܬܐ ܪܒܐ ܓܘܐ ܗܢܡܐ ܠܫܘܚܠܦܐ ܒܕܪܓܐ ܕܫܚܝܢܘܬܐ ܕܝܘܡܐ . ܘܡܬܩܪܝܐ ܗܕܐ ܒܫܡܐ ܐܘ ܒܪܝܬܘܬܐ ܫܚܝܢܘܬܢܝܬܐ (Thermo Periodism) . ܘܡܢ ܡܬܚܠܦܢܘܬܐ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ ܟܠ ܦܪܢܣܘܬܐ ܘܡܬܪܨܦܐ ܕܨܘܡܚܐ ܘܪܒܝܐ . ܕܦܝܫ ܣܘܟܐ ܠܗ ܣܒܪܬܐ ܐܚܪܬܐ ܐܝܟ ܕܠܒܡܐ ܘܡܪܡܚܐ ܘܡܕܦܩܐ ܘܡܬܪܒܝܢ . ܠܐ ܦܫܛ ܐܝܬ ܐܚܪܬܐ ܐܝܟ ܦܪܛܘܬܐ ܠܦܘܬ ܚܘܪܐ ܐܡܝܢܐ ܗܘ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ ٢٠ ܡ° . ܐܘ ܝܬܝܪ ܥܠܝܗ . ܐܠܐ ܡܫܟܚ ܠܕܪܓܐ ܥܠܝܐ ܡܘܦܩܐ . ܠܡܗܘܐ ܒܪܝܐ . ܡܛܠ ܡܘܪܕܝܢܘܬܐ ܕܢܨܒܬܐ ܠܡܬܪܨܦܐ ܕܡܬܕܢܝܢܐ ܕܘܪܕܐ (Flower Primordia) . ܘܐܘܐ ܡܬܩܪܝܐ ܗܕܐ ܒܫܘܢܝܬܐ ܕܪܒܝܥܘܬܐ (Vernalization) ܘܡܬܪܠܐ ܒܫܘܚܠܦܐ ܐܘ ܡܬܢܝܬܐ ܐܝܘܡܢܝܐ . ܠܡܦܪܢܣܘ ܕܥܠܬܐ ܒܪܝܬܐ ܠܗ ܣܒܪܬܐ ܐܚܪܬܐ . ܘܦܪܝܫܐ ܡܢܗܘܢ .

ܘܡܫܬܝܠܐ ܕܪܟܢܐ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ ܒܫܒ ܡܢܠܬܐ ܒܒܪܝܐ ܡܢ ܪܒܝܬܐ ܕܢܨܒܬܐ . ܡܫܪܘܝܐ ܒܥܘܬܐ ܡܢ ܡܢܠܬܐ ܕܪܒܝܬܐ ܢܪܘܡܐ ܠܡܢܠܬܐ ܕܪܒܝܬܐ ܕܦܪܢܣܘܬܐ . ܘܫܘܚܠܦܐ ܗܢܐ ܕܕܪܓܐ ܕܫܚܝܢܘܬܐ ܚܕ ܡܢܗܘܢ ܐܢܫܐ ܒܣܝܡܬܐ ܕܡܗܘܝܐ ܕܦܝܠܐ (ܦܘܠܐ) ܠܗ ܨܠܡܐ ܕܘܪܕܐ ܒܢܨܒܬܐ . ܘܠܐܘܐ ܐܝܟ ܐܝܟܢܐ ܡܢ ܢܨܒܬܐ ܠܐ ܡܘܒܝܐ . ܐ . ܠܐ ܦܫܛ ܠܠܒܝܫܐ ܠܕܪܓܐ ܕܫܚܝܢܘܬܐ ܒܝܬ ܥܠܝܐ ܡܢ ٢٧ ܡ° . ܐܝܟܢܐ ܒܘܪܐ ܘܪܒܝܬܘܬܐ ܕܡܫܚܐ ܕܡܬܘܪܝܬܐ . ܡܬܥܒܕ ܒܪܒܝܬܐ ܢܪܘܡܘܬܢܝܬܐ . ܘܥܒܕ ܒܘܪܟܐ ܕܦܫܛܐ . ܘܡܬܘܪܝܬܐ ܢܗܘܐ ܕܒܪܝܬܐ ܒܕܪܝܬܐ (Photo Periodism) ܡܛܠ ܒܪܐ ܒܡܪܨܦܐ ܕܘܪܕܐ ܡܬܪܕܝܢ ܠܦܫܛܐ . ܘܦܝܫ ܡܫܬܘܡܠܐ ܐܘ ܡܠܘܐܐ ܒܐܘܪܐ ܒܝܬ ܐܪܒܥܐ ܠܗ ܦܫܛܐ ܥܒܕܢܐ (ܗܘܝܘܬܐ ܘܪܡܘܬܐ) .

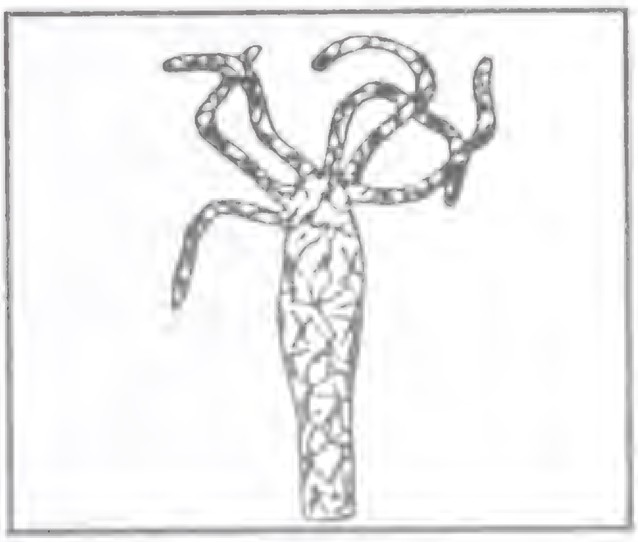
٤ . ܝܬܝܪܐ ܠܗ ܡܢܘܬܐ :

ܐܝܟ ܐܪܥܢܐ ܠܢܒܪܐ ܒܬܫܡܫܬܐ ܕܝܬܝܪܐ ܠܗ ܡܢܘܬܐ . ܘܗܘ ܝܠܗ ܡܢ ܐܢܝ ܗܘܢܐ ܒܝܬ ܡܣܦܩܐ ܕܠܘܚܡܐ ܒܪܘܚܐ ܘܠܗܘܦܐ . ܘܡܬܘܪܝܐ ܝܠܗ

ܡܢ ܫܘܪܝܐ ܚܝܘܬܐ . ܘܒܠܝܫ ܣܕܪܘܬܗ ܕܘܒܪܢܝܬܐ ܘܥܒܕܢܝܬܐ . ܘܐܝܬ ܡܢܝܫ ܠܗ ܗܘܡܢܐ ܚܝܘܬܐ ܕܟܪܢܬܐ ܡܢ ܕܘܪܐ ܠ ١٠ ܫܘܪܝܐ . ܗܘܦܟܐ ܠܐܝܟ ܐܘܐ ܡܢܝܢܐ ܡܢ ܫܘܪܝܐ ܗܕܝܘܬܐ ܠܐ ܘܡܕܪܢܬܐ . ܐܝܟ ܕܒܝܬܐ ܗܢܐ ܡܕܝܢܐ ܕܟܡܢܐ ܚܝܘܬܐ .

ܐܝܬ ܠܗ ܐܘܪܚܬܐ ܚܝܘܬܐ ܦܫܝܛܬܐ ܡܬܘܬܪܢܝܬ ܠܚܫܘܬܐ ܠܐ ܦܪܕܢܝܬܐ . ܟܕ ܠܐܝܬ ܠܘܪܟܗܘܢ . ܢܗܘܪܐ ܐܘ ܐܢܫܐ ܕܐܠܦܐ ܡܢ ܫܘܪܝܐ ܚܝܘܬܐ .

ܫܡܐ ܡܬܬܪܘܬܐ ܠܗ ܐܘܪܚܬܐ ܚܝܘܬܐ ܫܪܫܘܬܐ ܕܫܘܪܝܗ ܡܢ ܚܕ ܚܝܘܬܐ . ܘܡܘܬܒܐ ܪܘܚܐ ܠܫܘܪܝܐ ܒܟ ܚܕܪܐ . ܘܦܝܫ ܡܫܘܡܫܐ ܡܢܝܢܐ ܕܐܝܬ ܡܘܬܒܐ ܠܚܕܐ ܫܘܪܝܐ . ܠܗ ܐܘܪܚܬܐ ܚܝܘܬܐ ܡܬܬܪܘܢܐ ܕܟܪܢܬܐ ٢٠٠ ܡܘܬܒܐ . ܐܝܟܐ ܡܢ ܚܝܘܬܐ ܕܐܪܥܢܝܬܐ ܕܥܒܕܘܬܐ ܕܫܘܪܝܐ . ܐܝܬ ܡܫܡܫܢܝܬܐ ܡܢܗ . ܘܐܝܬ ܗܕܐ ܐܪܥܐ ܡܢܝܫ ܒܠܫܢ . ܐܪܥܐ ܕܫܘܟܢܐ ܕܒܝܬܐ . ܚܕܐ ܡܢ ܡܫܟܚܢܘܬܐ ܕܚܝܘܬܐ . ܘܡܢܗܕ ܠܫܘܪܐ ܕܐܪܥܐ ܗܕܝܐ . ܡܬܬܦܫܢܐ ܒܪܥܘܐ ܚܝܘܬܐ (Nerveimulse) . ܗܘ ܕܐܝܬ ܠܗ ܪܒܠܐ ܚܝܘܬܐ . ܡܬܕܪܝܢ ܐܘܪܚܬܐ ܚܝܘܬܐ ܠܗ ܚܫܘܬܐ . ܘܠܗ ܐܝܬ ܡܫܘܠܐ ܒܟ ܦܫܝܛܬܐ ܕܬܘܪܘܗ . ܐܝܟ ܕܠܐܘ ܐܝܬܝܘܬܐ ܠܗ ܚܫܘܬܐ ܠܗܢܝܢ ܡܢܝܢ . ܚܠܦ ܨܘܪܬܐ ܕܓܪܡܐ . ܡܢܗ ܡܢ ܫܘܪܝܗ ܦܪܝܫܬܐ ܒܝܢܬܐ ܕܠܘܫܡܐ ܕܚܫܘܬܐ . ܪܒܠܐ ܚܝܘܬܐ ܒܐܝܕܝܐ ܡܬܠܦܐ . ܘܡܬܬܚܒ ܒܟ ܚܕܪܐ . ܨܘܪܬܐ (٦ ـ ٣) . ܘܡܬܝܕܥ ܡܕܘܢܬܐ ܕܗܕܝܪܘܬܐ ܚܝܘܬܐ . ܠܗ ܢܘܡܘܐ ܕܡܬܬܚܝܘܬܐ ܐܝܬ . ܐܦ ܡܬܝܕܥ ܠܗ ܐܘܐ ܓܪܡܐ ܥܘܪܩܐ ܕܡܬܠܕܐ ܚܝܘܬܐ ܘܡܥܠܝܬܐ ܗܘܦܟܝܢܬܐ . ܘܡܬܪܒܝܢ ܕܠܠܘܫܐ ܕܫܪܐ ܦܫܝܛܐ ܡܢ ܠܘܥܡܐ ܕܚܫܘܬܐ ܠܚܕ ܡܘܗܪܢܐ . ܦܪܫܐ ܡܢܢܝܬܐ ܒܗܝ ܦܫܝܛܐ . ܘܡܬܒܪܐ ܠܗ ܐܦ ܠܡܫܡܫܐ ܒܪܢܐ .



ܨܘܪܬܐ (٦ ـ ٣) ܓܪܡܐ ܚܝܘܬܐ ܕܗܝܕܪܐ

ܣܘܥܪܢܬܐ ܕܝܠܗ ܡܬܚܫܚܬܐ ܕܡܪܟܙܐ ܥܨܒܝܐ ܦܫܝܛܬܐ ܐܡܝܢܬܐ ܒܚܘܫܒܐ
ܕܐܘܪ̈ܚܬܐ ܥܨܒ̈ܝܐ . ܟܕ ܡܪܟܝܒ ܠܗܘܢ ܠܘܬܟܐ ܕܓܘܫܡܐ ܥܨܒܝܬܐ .
ܘܐܫܟܚ ܩܘܪܬܐ ܒܐܘܪܚܐ ܕܦܪܫܐ ܥܨܒ̈ܝܐ . ܦܠܚܝܢ ܡܢ ܫܪܝܢ . ܦܬܝܐ
ܪܫܝܡܬܐ ܐܝܟ ܐܝܟ ܦܫܝܛܬܐ ܠܗ ܚܘܫܒܐ ܠܐ ܦܘܪܫܢܬܐ ܐܝܟ ܡܘܠܟܐ
ܢܠܡܕܢܐ ܘܥܢܝܢܐ . ܘܦܝܫ ܚܝܠܐ ܒܐܘܪܚܐ ܐܘܪ̈ܚܬܐ . ܕܡܪܟܙܐ ܥܨܒܝܐ ܠܚܕ
ܡܪܟܙܐ ܠܓܘܫܡܐ . ܡܢܗ ܒܟܠܗܘܢ ܘܦܪܝܫܬܐ ܠܗܘ ܡܪܟܙܐ . ܘܟܠܗ ܠܗ
ܠܚܕ ܡܪܟܙܐ ܚܒܝܫܐ ܐܘ ܢܦܝܫ . ܐܝܟ ܡܪܟܙܐ . ܡܬܪܘܨܐ ܚܝܠܐ ܥܨܒ̈ܝܐ
ܒܪܫܢ̈ܐ ، ܠܗ ܐܝܬ ܚܘܫܒܐ .
ܘܦܫܝܛܬܐ ܗܠܝܢܬܐ ܒܚܘܫܒܐ ܕܐܘܪ̈ܚܬܐ ܥܨܒ̈ܝܐ ܠܗ ܚܘܫܒܐ . ܡܢ
ܟܠܒܪܐܠܗܘܢ ، ܡܢ ܫܢܝܬܐ ܠܗܘܦܟܬܐ ܡܡܪܟܙܢܝܬܐ . ܘܡܬܒܝܠܝܢ ، ܡܢ
ܡܬܚܒܪܢܘܬܐ ܕܚܘܫܒܐ ܕܚܕ ܡܢܝܢܐ ܡܢ ܡܪܟܙܐ ܥܨܒܝܐ ܒܡܬܒܡܣܘܬܐ
ܕܓܘܫܡܐ . ܡܬܪܘܨܐ ܕܡܫܒܚܐ . ܘܡܫܒܚܐ ܒܝܕ ܡܡܪܟܙܐ ܘܡܬܚܫܚܐ ܠܗ ، ܡܢ
ܡܪܟܙܐ ܥܨܒܝܐ . ܘܡܬܠܒܟ ܥܠ ܒܪܫܢ̈ܐ ܕܡܪܟܙܐ ܥܨܒܝܐ ܠܗ ܠܓܘܫܡܐ .
ܘܡܬܚܫ ܒܥܒܪܘܬܗ ܥܠ ܗܘܡܐ ܐܣܪܝܐ ܡܢ ܐܘܪ̈ܚܬܐ ܥܨܒ̈ܝܐ ܡܪܟܙܘܢܝܐ .
ܠܗ ܚܘܫܒܐ ܦܘܪܫܢܬܐ ܘܦܪܝܫܝܬܐ ܚܝܠܐ ܒܘܟܪ̈ܐ . ܘܡܫܒܚܐ ܡܡܪܟܙܘܬܐ
ܕܡܫܒܚܐ ܘܡܬܠܒܟܘܬܗ ܠܟܠ ܕܡܪܟܙܐ ܐܠܗ . ܒܐܘܪܚܐ ܕܡܪܟܙܘܢܝܐ
ܕܫܒܪܘܬܐ ، ܘܡܦܫܛܐ ܕܥܒܝܕܬܐ ܠܗܘ .

٤ ـ ١ ـ ܩܘܪܬܐ ܥܨܒܝܬܐ (ܥܨܒܬܐ) :

ܦܪܝܫܐ ܗܝ ܩܘܪܬܐ ܥܨܒܝܬܐ ܡܢ ܥܨܒ̈ܐ ܕܓܘܫܡܐ ܘܐܫܟܚܬܐ ܠܗ
ܚܘܐ ܡܬܚܠܦܐ . ܘܐܦ ܒܚܕ ܚܘܫܒܐ . ܡܬܚܐ ܠܓܘܫܡܐ ܒܝܢ (٤ ـ ١٣٥)
ܡܬܚܫܚܬܐ . ܘܒܗܘܕܝܐ ܗܘܝ ܩܘܪܬܐ ܥܨܒܝܬܐ ܕܘܪܒܬܐ ܡܢ ܐܝܟ
ܩܘܪܬܐ ܕܓܘܫܡܐ ܒܝܕ ܒܥܒܪܘܬܐ . ܐܝܟ ܡܢ ܥܨܒ̈ܐ ܕܐܫܟܚܐ ܟܠܗܝܢ ܗܘܝ
ܒܡܬܚܢܬܐ ܐܘ ܒܡܬܒܚܢܬܐ ܐܘ ܠܓܘܫܡܐ . ܡܬܚܘܪܬܐ ܐܠܗ ܩܘܪܬܐ
ܥܨܒܝܬܐ ܡܢ ܦܪܘܦܠܐܣܡ ܘܠܪܘܡܐ ، ܕܫܒܝܟ ܒܠܗܘ ܥܠ ܠܪܘܡܢܐ . ܘܗܘ
ܒܠܗ ܠܓܘܫܡܐ ܢܘܪܐ ܪܒܐ ، ܟܡܐ ܠܝܟܚܬܐ ܒܬܘܡܡܘܬܐ . ܘܡܪܒܝܐ ܐܠܗ
ܒܦܠܝܡ ܠܪܘܡܢܐ ، ܡܫܒܚܐ ܥܠ ܕܡܘܬܐ ܕܪܘܡܡܘܬܗ ، ܦܬܝܐ ܐܠܗ ܡܬܚܘܡܘܬܐ
ܦܪܘܦܠܐܣܡ ܠܗ ܩܘܪܬܐ ܥܨܒܝܬܐ ܒܦܠܝܡ ܥܨܒ̈ܐ (Neuro Plasm) ، ܘܫܒܝܟ

ܥܠ ܗܿܕܡܫܘܬܦܢܘܬܐ ܕܟܘܪܗܐ ܚܘܠܡܢܝܬܐ ܕܢܚܫܐ ܐܝܟ ܡܣܬܥܪܢܘܬܐ، ܘܠܘܩܒܠ ܕܟܘܠܝܢ. ܘܟܠܝܬܐ ܕܬܪܝܬܗ ܒܡܫܬܥܝܘܬܐ ܕܡܬܘܪܒܝܢܐ ܠܥܨܒܘܢܐ، ܡܟܝܠ ܪܘܟܒܐ ܕܚܒܫܐ، ܐܝܟ ܠܒܘܫܐ ܦܠܘܡܢܐ ܠܦܢܐ، ܘܪܝܩܘܣܘܡܐ، ܘܦܪܨܝ ܠܗܘ ܠܒܪܐ ܠܬܐܐ ܘܐܟܘܟܘܢܐ ܕܚܒܫܐ. ܦܪܝܬܐ ܐܝܬ ܗ̇ܝ ܣܪܘܦܠܘܡ ܕܟܘܪܗܐ ܠܬܐܝܬܐ ܟܐܝܬܘܬܐ ܕܠܘܩܒܠ ܕܢܝܫܐ. ܘܐܝܟ ܫܟܝܚ ܥܠ ܚܫܘܒܐ ܕܪܝܩܘܣ ܠܪܘܡܢܐ (RNA)، ܘܦܪܝܫ ܡܘܦܠܚܐ ܠܡܦܫܬܐ ܕܡܠܘܐܐ ܦܪܘܬܝܢܐ ܐܢܙܝܡܐ. ܠܡܬܡܪܬܐ ܕܥܒܕܐ ܕܟܘܪܗܐ ܠܬܐܝܬܐ. ܘܐܟܘ ܝܬܝܪ ܒܪܒܪܐܝܬ ܐܝܟ ܕܡܘܟܝܠܘܢ، ܡܢ ܕܪܥܬܗ، ܒܡܫܬܥܝܘܬܐ ܕܡܬܘܪܒܝܢܐ ܠܥܨܒܘܢܐ. ܦܢܝܬܐ ܡܢܝܬܪ، ܠܗܿܘ ܠܒܪܐ ܦܠܘܡܢܐ ܠܦܢܐ ܡܟܢܐ، ܒܗ ܪܝܩܘܣܘܡܐ ܣܓܝܐܐ. ܐܦ ܦܪܝܬܐ ܡܢ ܟܐܝܬܘܬܐ ܕܪܟܠܘܢܐ ܠܬܐܝܬܐ. ܘܐܦ ܡܘܟܝܠܘܢ، ܕܐܟܘ ܝܬܝܪ ܡܬܦܪܢܬܐ ܡܢ ܠܒܪܐ ܠܬܐܝܬܐ، ܡܬܚܙܝ ܡܢ ܠܘܩܒܠ ܕܟܘܪܗܐ ܠܬܐܝܬܐ ܢܝܪܐ ܦܪܘܬܘܦܠܘܡܝܐ. ܘܟܠܚܕܐ ܫܒܝܠܐ ܟܘܪܗܐ ܥܠ ܚܕ ܢܝܪܐ، ܐܝܟ ܕܐܠܘ ܐܬܚܙܝܬܐ ܠܗ ܟܘܪܗܐ ܕܟܘܪܐ ܟܘܠܝܐ. ܐܘ ܟܠܚܕ ܗܿܘܐ ܡܬܢܒܥ ܢܝܪܐ. ܐܝܟ ܚܕܟܡܐ ܟܘܪܗܐ ܕܡܬܚܙܝܢܐ ܕܥܒܕܐ، ܘܓܘܫܐ ܡܬܚܙܐ ܠܬܐܐ ܠܪܥܝܢܐ ܕܡܬܚܙܝܐ. ܘܪܒܐ ܠܗܘ ܗܿܘܐ ܡܦܪܫ ܢܝܪܐ، ܡܬܠܘܦܫܬܐ ܟܟܘܪܗܐ ܕܐܘܪܒܐ ܠܬܐܐ ܡܬܚܪܘܢܐ، ܘܡܬܚܙܐ ܙܥܘܪܐ (ܨܘܪܬܐ ٦ ـ ٤)، ܘܢܝܪܐ ܕܟܘܪܗܐ ܠܬܐܝܬܐ ܐܝܬܝܗ ܒܬܪܝܢ ܐܕܫܐ:

ܐ ـ ܗܕܪܐ (ܫܘܠܦܐ ܗܕܪܐ): ܘܗܘ ܟܬܒܐܝܬ ܐܝܬܘܗܝ ܢܝܪܐ ܠܣܘܓܐܐ. ܡܪܐ ܡܬܚܙܐ ܡܣܘܥܪܐ، ܘܣܓܝ ܒܦܪܝܫܐ ܕܚܒܫܐ، ܦܪܝܩ ܡܢܗ ܡܕܝܢܐ ܦܪܟܘܢܐ ܚܘܬܡܝܐ (Telodendria).

ܒ ـ ܢܝܪܐ ܐܝܠܢܝܐ (Dendrites): ܐܝܬܝܗ ܢܝܪܐ ܡܬܚܠܦܐ ܡܬܚܙܐ. ܢܦܩܝܢ ܟܡܐ ܕܢܦܩ ܡܢ ܠܘܩܒܠ ܕܟܘܪܗܐ ܡܢ ܐܝܠܢܐ ܕܦܪܟܘܢܘܬܗ.

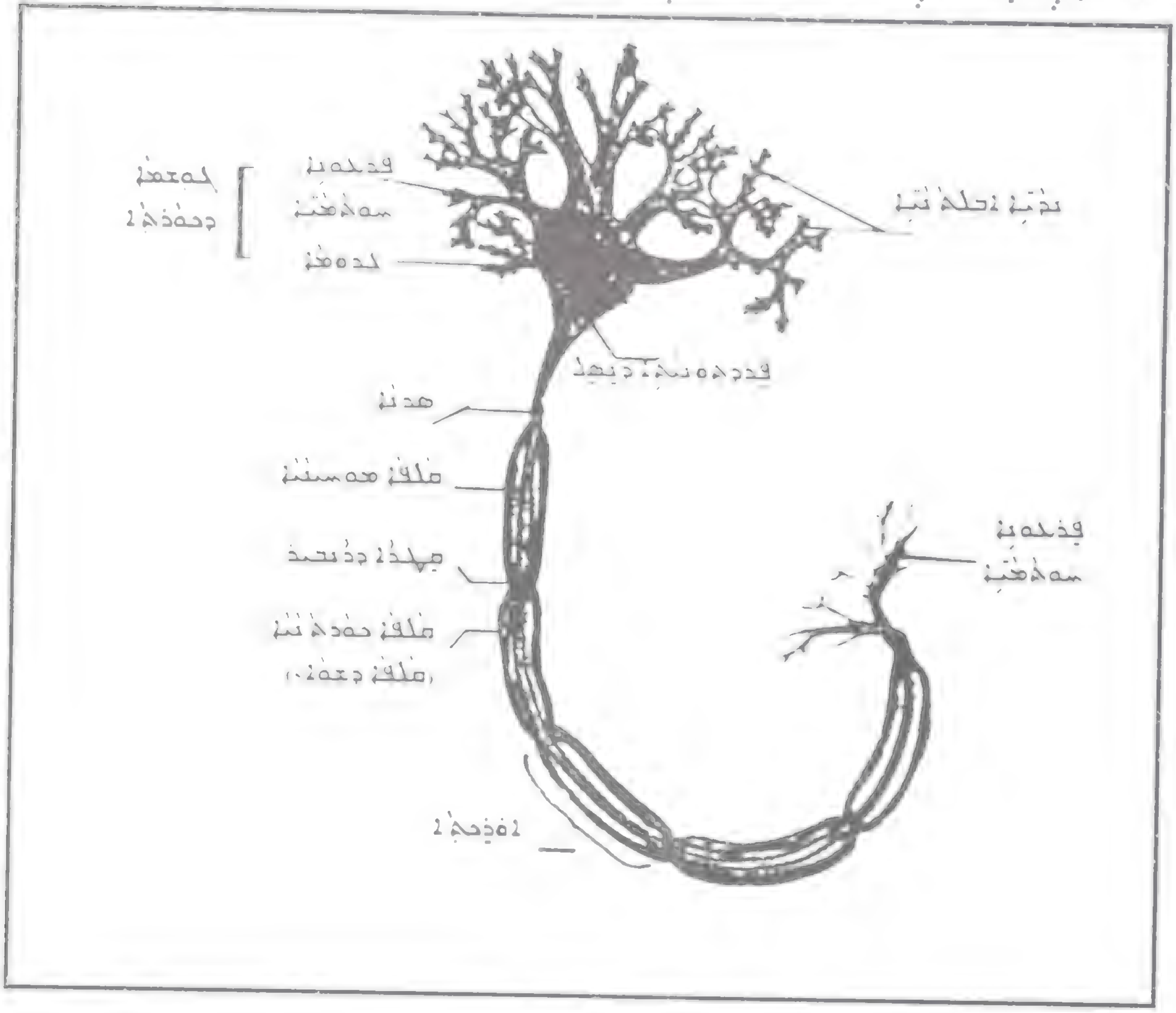
٤ ـ ٢ ـ ܐܕܫܐ ܠܬܐܝܬܐ:

ܦܪܝܫܐ ܐܝܬ ܠܗ ܟܘܪܗܐ ܠܬܐܝܬܐ ܚܕ ܢܝܪܐ ܐܟܣܘܢܐ، ܗܿܘ ܚܕܟܡܐ ܠܗܘܢ ܢܝܪܐ ܐܝܠܢܝܐ. ܐܝܟ ܕܐܠܘ ܐܬܚܙܝܬܐ ܠܗ ܟܘܪܗܐ ܠܬܐܝܬܐ ܐܟܣܘܢܐ. ܘܟܬܒܐܝܬ ܗܿܘܐ ܚܕ ܗܕܪܐ ܡܬܚܙܐ ܡܢ ܟܘܪܗܐ ܘܡܬܚܙܝܐ ܠܗ

ܐܘܪ̈ܚܬܐ ܥܨ̈ܒܝܐ ܡܫܬܚܠܦ̈ܢܐ ܐܦ ܡܫܬܘܫ̈ܛܢܐ (ܠܡܫܘܕܥܢܘܬܐ ܘܡܣܒܪ̈ܢܘܬܐ) . ܘܐܝܬ ܥܨ̈ܒܝܐ ܐܝܟ ܗܘܝ ܕܡܠܘܫܐ ، ܐܘ ܕܒܝܬ ܒܡܠܘܐ̈ܐ ܡܥܝܢ̈ܐ ܚܘܪ̈ܐ . ܦܝܫܐ ܐܝܬܘ ܡܫܘܡܗܐ ܒܡܠܘܐ̈ܐ ܕܡܘܣܝܢܐ ، ܘܐܝܬܘ ܓܪ̈ܡܝ ܐܒܢܘܬܐ . ܦܝܫ ܡܢܝܐ ܪ̈ܓܠܐ ܥܨ̈ܒܝܐ ، ܘܥܠ ܕܐܗܐ ܐܦ̈ܐ ܡܢ̈ܝܢ ܦܠܝܓܝܢ ܠܪ̈ܓܠܐ ܠ :

ܐ . ܪ̈ܓܠܐ ܥܨ̈ܒܝܐ ܡܘܣܝܢܝܐ (ܡܪܝܡܐ) .

ܒ . ܪ̈ܓܠܐ ܥܨ̈ܒܝܐ ܠܐ ܡܘܣܝܢܝܐ (ܠܐ ܡܪܝܡܐ) .



ܐܣܟܡܐ (٦ ـ ٤) ܡܫܘܕܥܐ ܠܬܐܪܬܐ ܥܨܒܝܬܐ

ܡܛܠ ܡܠܘܐ̈ܐ ܕܡܘܣܝܢܐ ܠܥܪ̈ܩܐ . ܘܗܘ ܐܝܬܘ ܐܣܛܘܠܐ ܡܣܝܒ ܡܬܚܫܚ̈ܐ ، ܡܢ ܚܠܒ̈ܐ ܬܐܪ̈ܬܢܝܐ . ܥܒܕ ܡܢ ܬܐܪ̈ܬܐ ܐܝܟܝܐ ܒܬܐܪ̈ܬܐ ܕܫܘܐܢ (Schwann Cells) . ܥܒܕ ܗܘܡܐ ܐܢܫ̈ܝܐ ܡܢ ܬܐܪ̈ܬܐ ܕܫܘܐܢ ، ܒܡܘܣܝܢܐ . ܒܐܣܟܡܐ ܕܚܠܒܐ . ܐܝܟܢܐ ܐܝܬܘ ܒܚܠܒ̈ܐ ܥܨ̈ܒܝܐ (Neurilemma) . ܘܗܢ̈ܐ ܦܝܫ̈ܐ ܐܝܬܘ ܓܠܝ̈ܐ ܕܡܠܘܐ̈ܐ ܕܡܘܣܝܢܐ ܐܝܬܘ ܝܩܦܐ ܡܢ ܚܠܒ̈ܐ ܦܠܘܛ̈ܐ ܠܬܐܪ̈ܬܐ ܕܫܘܐܢ . ܘܐܝܬܐ ܥܠ ܚܕܕ̈ܐ . ܥܒܕ ܗܪܢܐ ، ܘܥܠ ܕܐܗܐ ܐܬܓܒܝܘ ܒܡܫ̈ܢܐ ܐܝܬܘ ܡܥܝܢ ܘܦܪܘܫܢܘܬܐ . ܐܝܟ ܕܥܒܕܝܢ ܠܗ ܒܢ̈ܝܐ ܕܚܠܒ̈ܐ ܕܬܐܪ̈ܬܐ . ܚܠܦ ܚܠܒ̈ܐ ܡܘܣܝ̈ܢܐ ܥܠ ܐܣܝܩܘܬܐ

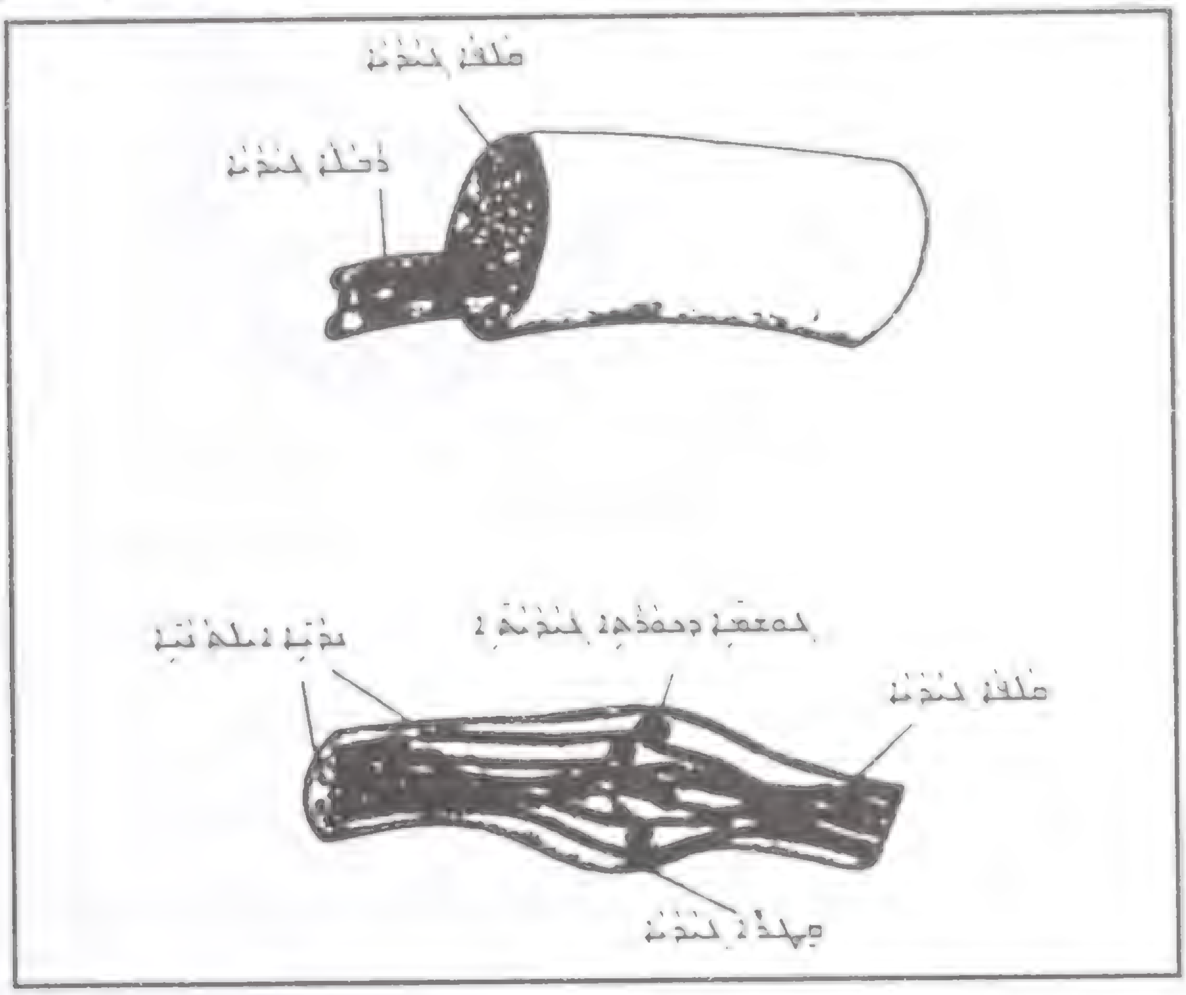
ܡܬܩܪܝܢܐ ܦܬܐ ܗܢܐ ܡܟܘܡܟܐ ܒܡܫܘܡܐ ܀ ܡܠܝܢܝܬܐ . ܘܗܘܝܐ ܦܬܐ ܣܠܩܐ ܓܝܕܐ ܒܡܫܟܬܐ ܠܗ ܗܕܢܐ . ܘܦܬܐ ܗܢܐ ܡܕܝܐ ܐܝܟ ܦܫܝܛܐ ܕܦܬܝܬܐ ܒܡܬܢܝܬܐ ܕܪܢܒܝܪ Nodes of Ranvier . ܘܐܢܫܝܢܐ ܐܠܗ ܠܓܝܕܐ ܕܓܪܓܝܣ ܕܒܘܪܬܐ ܕܟܘܪܐ . ܡܠܝܐ ܠܕܫܡܘܬܐ ܒܝܢ ܗܕܢ ܡܬܢܝܬܐ ܥܒܝܕܐ . ܐܘ ܗܢܐ ܕܡܕܡܝܬܐ ܐܠܗ ܒܐܘܪܚܬܐ .

٤ - ٣ - ܓܝܕܐ ܡܫܘܚܕܢܐ :

ܗܟܝܢ ܐܪܓܠܐ ܓܝܕܢܝܐ ܕܡܬܕܪܝܢ ܡܫܬܘܬܦܢܝܬܐ ܓܝܕܢܝܬܐ . ܡܕܡܝܐ ܒܚܕ ܘܡܘܕܐ ܐܚܪܢܐ . ܘܡܬܩܪܝܢ ܡܬܕܪܝܢ ܠܓܝܕܐ ܡܫܘܚܕܢܐ . ܘܡܕܡܝܐ ܐܠܗ ܒܗܘܢܝܐ ܕܡܠܦܘ ܕܪܓܠܐ ܚܕ ܘܡܘܕܐ ܐܚܪܢܐ ܣܓܝܐܐ . ܒܐܘܪܚܐ ܗܢܘܢ ܓܝܕܐ ܒܡܬܝܢ ܕܡܢܝܐ ܐܝܟ ܠܗ ܨܘܪܬܐ (٦ - ٥ ܐ) .

4 - 4 - ܩܛܪܐ ܓܝܕܢܝܐ :

ܗܟܝܢ ܠܒܘܫܐ ܕܒܘܪܬܐ ܓܝܕܢܝܬܐ ܠܪܓܠܐ ܕܐܘܪܓܠܐ ܓܝܕܢܝܐ ܡܬܩܛܪܝܢ ܠܗ ܗܕܡܐ ܡܟܘܡܟܐ ܩܛܪܐ . ܦܬܐ ܐܠܗ ܒܕܡܝܐ ܩܛܪܐ ܡܢ ܪܓܠܐ ܒܡܠܦܐ



ܨܘܪܬܐ (٦ — ٥) (ܐ) ܨܘܪܬܐ ܡܫܪܛܛܐ ܡܚܘܝܐ ܠܚܬܟܐ ܕܪܓܠܐ ܓܝܕܢܝܐ ܠܗ ܓܝܕܐ .

(ܒ) ܨܘܪܬܐ ܡܫܪܛܛܐ ܡܚܘܝܐ ܠܗܘܕܝܐ ܕܩܛܪܐ ܓܝܕܢܝܐ ܡܢ ܠܒܘܫܐ ܕܒܘܪܬܐ ܓܝܕܢܝܬܐ .

ܡܢ ܘܗܘܪܐ ܐܣܦܪܐ ܕܒܢܝܐ ܒܠܘܚܝܗ (Capsule). ܚܕܐ ܡܢܗܘܢ ܐܣܦܩܬܐ
ܠܐܘܪܚܐ ܚܠܒܝܬܐ ܥܠ ܐܪܥܐ ܡܠܘܐ ܣܗܪܐ. ܘܒܪܕܐ ܗܘ ܟܠ ܐܘܪܚܐ
ܒܝܕ ܒܘܢܝܐ ܡܢ ܐܘܪܚܐ ܘܐܘܪܚܬܐ ܕܒܢܝܐ ܒܐܘܪܚܬܐ ܢܣܘܦܬܐ (Satellite)
ܒܣܘܢܩܐ ܕܣܒܪܐ ܚܕܡܬܐ ܐܝܟ ܕܐܣܟܡܐ (٦ ـ ٥ ܒ).

٤ ـ ٥ ـ ܢܒܥܐ ܕܐܘܪܚܐ ܚܠܒܝܬܐ:

ܐܝܬܐ ܡܬܚܘܝܬܐ ܕܗܘܝܘܬܐ ܥܠܡܐ ܠܐ ܐܘܪܚܐ ܚܠܒܝܬܐ. ܠܚܘܕܐ
ܕܝܠܗ ܦܠܘܓܐ. ܐܘ ܠܥܠܡܐ ܕܝܠܗܘܢ ܦܠܘܓܐ ܦܘܫܬܐ ܘܡܫܚܬܐ
ܘܒܝܢܬܐ ܕܗܘܝܘܬܐ ܕܐܘܪܚܐ ܚܠܒܝܬܐ ܒܡܗܘܪܐ ܡܠܝܐ. ܠܒܪܝܬܐ
ܕܡܢܝܢܬܐ. ܡܫܠܡܐ ܡܢܝܢܬܐ ܕܐܘܪܚܐ. ܒܣܘܟܐ ܕܟܘܟܒܐ ܚܠܒܝܐ. ܘܐܣܘܪܐ
ܚܠܒܝܐ ܒܪܝܬܗ. ܒܠܚܘܕ ܡܢܝܢܐ ܡܢ ܐܘܪܚܐ ܚܠܒܝܬܐ ܠܐܣܪܬܐ. ܐܘ
ܠܐܘܪܚܐ ܒܡܫܪܪܬܐ ܐܘ ܡܒܪܪܬܐ. ܘܡܒܪܒܠܗܘܢ ܐܝܟ ܕܝܠܗ
ܐܢܫܘܬܐ ܠܗ ܐܘܪܚܐ ܚܠܒܝܬܐ ܘܡܢܝܢܐ. ܐܢܐ ܐܘܪܚܐ ܚܠܒܝܬܐ
ܕܒܢܝܐ. ܡܢܝܢܐ ܕܣܘܐ ܠܗܘܢ. ܠܐܘܪܚܐ ܚܠܒܝܬܐ ܠܗ ܐܘܪܚܬܐ ܚܠܒܝܐ
ܡܬܒܪܘܢܐ.

ܡܢ ܗܢܐ ܕܡܒܝܢ. ܒܝܕ ܗܘܢܐ ܠܦܪܫܬܐ ܕܦܫܘܛܘܬܐ ܕܐܘܪܚܐ
ܚܠܒܝܬܐ ܕܪܟܒܐ ܕܐܘܪܚܘܬܐ:

١ ـ ܒܪܝܬܐ ܕܣܘܓܐ ܚܠܒܝܐ.
٢ ـ ܕܪܝܬܗ ܒܐܪܒܥܘܬܐ ܕܟܘܟܒܐ ܚܠܒܝܐ.
٣ ـ ܡܢܝܢܗ ܒܝܢ ܐܪܟܐ ܐܘܪܚܐ ܚܠܒܝܬܐ.

٤ ـ ٥ ـ ١ ـ ܒܪܝܬܐ ܕܣܘܓܐ ܚܠܒܝܐ:

ܦܠܘܓܐ ܚܒܝܒܐ ܕܒܘܬܐ ܕܢܘܦܐ ܐܣܝܪܐ ܒܪܝܬܘܬܐ ܕܒܪܝܬܐ
ܕܣܘܓܐ ܚܠܒܝܐ. ܠܗ ܟܘܟܒܐ ܚܠܒܝܐ ܢܚܠܝܡܐ ܡܬܒܪܝܢ ܐܝܟ (ܡܠܝܢܐ.
ܡܫܚ ܠܗ ܒܘܫܝܐ ܕܢܘܗܪܐ ܦܫܝܛܐ (ܢܒܪܝܐ). ܒܝܢܬܐ ܕܒܢܘܪܬܐ ܕܐܘ
ܟܘܟܒܐ ܒܐܪܒܥܐ ܒܡܬܚܘܝܬܐ ܕܐܘܪܚܐ ܐܠܗܪܘܢܐ ܕܡܫܐ. ܦܠܘܓܐ ܢܘܢܐ
ܕܝܠܗܘܢ ܕܟܘܟܒܐ ܚܠܒܝܐ ܥܠܝܐ ܡܬܒܪܝܢܐ. ܗܢܐ ܘܒܝܢ ܐܝܟܐ ܐܝܬ ܦܘܪܥܢܐ
ܒܢܘܠܐ ܒܝܢ ܠܗܐ ܕܟܘܟܒܐ ܘܒܪܝܗ. ܡܢܐ ܠܗ ܢܘܗܪܐ ܡܬܢܠܩܬܐ ܒܝܢ
٢٠ ـ ١٠٠ ܡܠܝܢ ܒܫܢܬܐ (ܡܒ). ܘܠܗ ܫܢܝܐ ܕܐܘܪܚܐ ܚܠܒܝܬܐ ܠܗ

ܒܪ̈ܢܫܐ ، ܒܣܘܪ ܕܦܘܪ̈ܫܢܐ ܕܟܡܝܠܐ ܒܐܝܢܝܘܬܐ ܕܥܠܝܘܬܐ ܘܡܢܝܢܘܬܐ ٦٠ ، ܡܒ . ܘܗܘܟܢܐ ܕܗܘ ܥܠܗ ܕܟܠܗ̇ ܕܡܘܪܕܝܬܐ ܡܕܝܥܢ̈ܐ ܥܠܗ ܒܦܫܝܛܘܬܐ ܕܒܪ̈ܝܗ . ܒܐܝܕܐ ܗܝ ܡܬܡܨܝܬܐ ܥܠܗ ، ܡܫܡܫܢܝܬܐ ܥܠܗ ܡܢ ܒܪ̈ܝܐ ، ܘܡܕܝܥܢܝܬܐ ܡܢ ܠܓܘ . ܘܚܕ ܦܘ ܠܡܐ ܐܣܪܐ ، ܕܥܒܕܝܢ ܒܪ̈ܝܐ ܡܚܘܫܢܐ ܥܠܗ ܒܣܘܪ ܒܪܘܡܬܐ ܡܢ ܐܫܘܬܐ ܡܫܡܫܢܝܬܐ . ܘܥܒܕܝܢ ܠܓܘ ܒܒܪܘܡܬܐ ܡܢ ܐܫܘܬܐ ܡܕܝܥܢܝܬܐ . ܦܝܫܐ ܥܠܗ ܡܬܩܪܝܐ ܦܘܪ̈ܫܢܐ ܕܟܡܝܠܐ ܐܘ ، ܒܟܡܝܠܐ ܕܡܢܝܢܘܬܐ . ܡܢ ܠܒܪ ܒܚܝܕܐ ܕܫܘܘܕܝܘܬܐ ܕܡܘܪܕܝܬܐ ܠܓܒܝܬܐ ؟

ܟܕ ܫܘܘ̈ܕܐ ܒܡܣܠܦܬܐ ܕܥܠܝܘܬܐ ܕܚܝܠܐ ܠܐܫܘܬܐ ܕܙܘܕܝܘܢ ܕܐܝܟ ܠܒܪ̈ܝܐ ܕܡܘܪܕܝܬܐ ، ܒܡܫܝܘܬܐ ܕܪܟܐ ܥܠܝܬܐ ، ܒܦܫܛܘܬܐ ܠܒܪ ܡܫܘܚܠܦ ܠܗ ܡܘܪܕܝܬܐ ، ܘܗܘܐ ܚܝܠܐ ܥܫܢܐ ܠܐܫܘܬܐ ܕܙܘܕܝܘܢ . ܠܒܪ ܐܫܘܬܐ ܕܙܘܕܝܘܢ ܠܓܘ ܡܘܪܕܝܬܐ ܠܓܒܝܬܐ ، ܘܡܫܪܝ ܠܗܠܦ̈ܬܐ ܠܗ ܡܬܡܨܝܬܐ . ܐܘܟܝܬ ܗܘܐ ܠܓܘ ܕܡܘܪܕܝܬܐ ܒܦܫܝܛܬܐ ܕܫܘܘܕܝܘܬܐ ܡܫܡܫܢܐ ܒܦܫܛܘܬܐ ܠܒܪ̈ܝܐ ܕܡܘܪܕܝܬܐ ، ܘܡܬܝܘܡܢܘܬܐ ܥܠܗ ܐܘ ܐܝܢܝܘܬܐ ܒܟܡܝܠܐ ܕܡܥܒܕܢܐ (Action Potential) . ܕܒܬܪ ܚܝܠܐ ܠܕܘܟܬܗ ܡܕܝܢܬܐ ، ܐܘܟܝܬ ܡܫܡܫܢܐ ܡܢ ܒܪ̈ܝܐ . ܘܡܕܝܥܢܐ ܡܢ ܠܓܘ ، ܡܢ ܥܠܬܐ ܕܦܠܛܬܐ ܕܐܫܘܬܐ ܕܦܘܛܐܣܝܘܡ k ܡܢ ܡܘܪܕܝܬܐ ܠܒܪ̈ܝܗ (ܕܚܕܪܬܐ ܕܡܬܡܨܝܬܐ) .

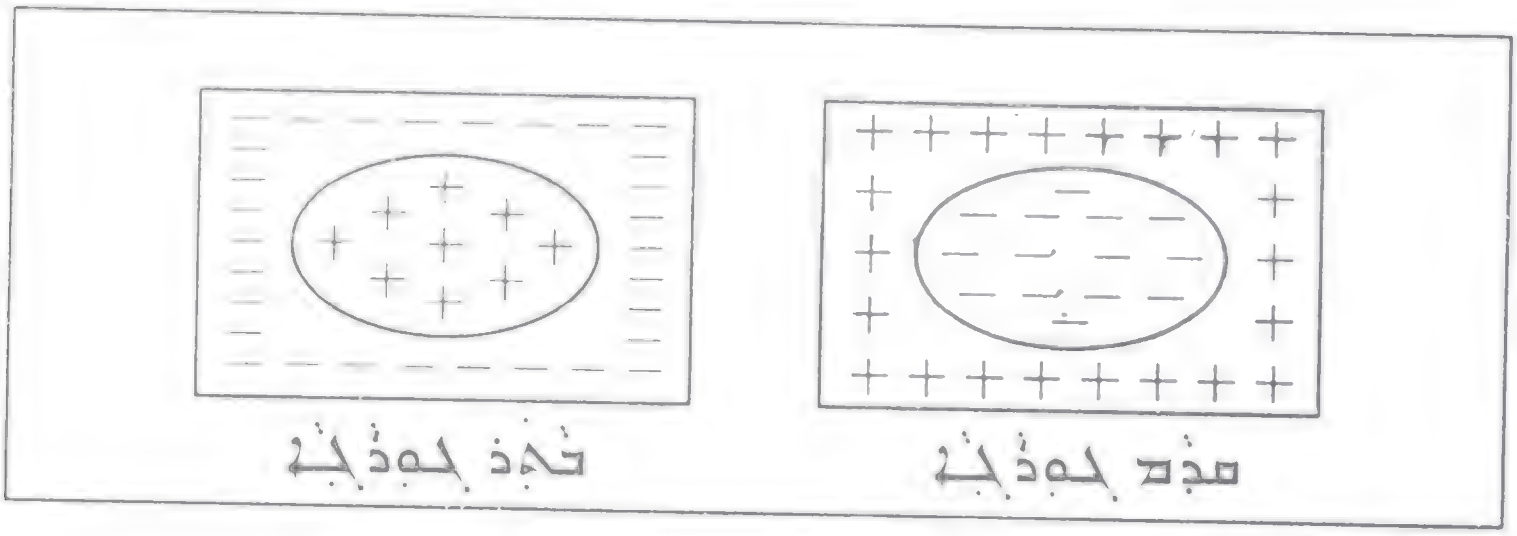
٤ ـ ٥ ـ ٢ ـ ܢܡܘܣܐ ܕܟܠ ܐܘ ܠܐ ܡܕܡ (All or None Law) :

ܒܥܐ ܒܝܗ ܡܢ ܐܗܐ ܢܡܘܣܐ . ܕܡܬܚܫܚܬܐ ܕܐܪܓܠܐ ܠܓܒܝܬܐ ܡܝܬܝܐ ܒܚܕܐ ܗ ܥܠܗ ܒܟܘܢܢܘܬܗ ܡܢ ܚܝܠܐ ܕܙܘܘܕܐ . ܘܠܐ ܡܙܕܪܓܢܐ ܒܕܘܪ̈ܓܐ ܕܚܝܠܐ ܕܙܘܘܕܐ ، ܘܗܘܐ ܒܚܫܘܚܘ ܡܠܝܐ ، ܐܝܟܢ ܕܡܗܠܐ ܙܘܘܕܐ ܠܚܫܘܚܐ ܕܐܫܬܘܦܬܐ (Threshold) ، ܘܦܝܫܐ ܒܚܕ̈ܪܐ ܕܥܠܠܬܗ ܠܡܥܢܝܬܐ ܠܚܫܘܚܐ ܕܐܫܬܘܦܬܐ . ܗܢܐ ܘܕܝܢ ܗܘ ܒܟ ܒܡܬܚܝܠܐ . ܐܘ ܠܐ ܡܬܚܝܠܐ .

ܘܡܕܝܢܬܐ ܥܠܗ ܐܫܬܘܦܬܐ : ܕܗܝ ܒܝܗ ܚܫܘܚܐ ܒܪ ܚܙܘܪܬܐ ܡܢ ܚܘܡܐ (ܚܝܠܐ ܕܙܘܘܕܐ) ܐܢܫܢܐ ܠܡܚܕܝܬܐ ܕܝܩܘܪܐ ܠܓܒܝܬܐ (ܡܬܚܫܚܬܐ ܠܗ ܐܪܓܠܐ ܠܓܒܝܬܐ) .

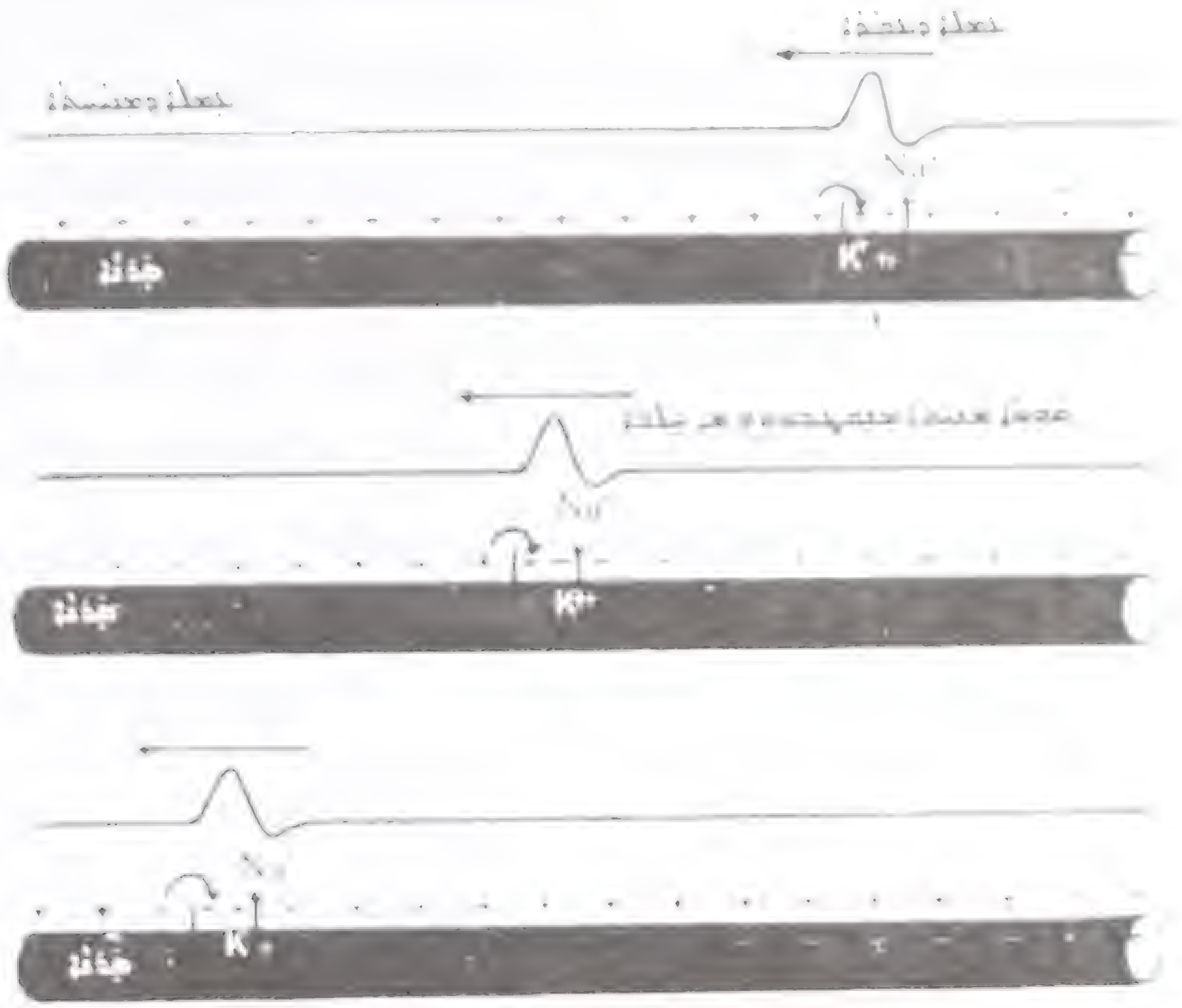
٤ ـ ٥ ـ ٣ ـ ܥܒܘܪܘܬܐ ܕܥܨܒܐ (Nerve Conduction) :

ܐܝܟ ܚܕܐ ܠܦܘܠܚܢܐ ܕܡܘܕܥܬܐ ܥܨܒܢܝܬܐ. ܐܘ ܥܒܪܬܐ ܥܨܒܢܝܬܐ ܡܢ ܕܘܟܬܐ. ܠܕܘܟܐ ܚܪܬܐ ܕܦܝܫܬܐ ܩܕܡ ܥܘܪܪܐ ܡܥܒܪܢܐ ܠܡܘܕܥܬܐ ܡܢ ܐܝܢܫܐ ܡܪܓܫܢܝܬܐ ܠܙܘܥܐ. ܘܡܥܒܪܢܘܬܐ ܐܝܢܫܐ ܡܫܬܚܠܦܬܐ. ܘܗܦܟܐ ܕܗܘܐ ܙܘܥܐ. ܒܚܘܣܠܐ ܥܠ ܦܘܠܚܢܐ ܥܨܒܢܝܐ ܠܡܘܕܥܬܐ. ܐܘ ܥܒܪܬܐ ܥܨܒܢܝܬܐ. ܟܕ ܦܝܫܬܐ ܡܓܪܓܬܐ ܗܘܝܐ ܚܕܐ ܥܘܕܪܬܐ ܡܫܬܚܠܦܬܐ ܠܙܘܥܐ. ܘܡܥܒܪܬܐ ܠܙܘܥܐ ܡܪܓܫܢܐ. ܐܝܟ ܕܦܝܫܬܐ ܗܝ ܡܫܘܚܠܦܬܐ ܥܠ ܡܫܘܕܥܢܘܬܐ ܗܘܐ:



ܡܫܚܠܦܢܘܬܐ ܠܦܝܫܬܐ ܡܫܘܚܠܦܬܐ ܡܢ ܚܝܠܐ ܕܥܒܪܬܐ ܥܨܒܢܝܬܐ

ܒܬܪ ܡܢ ܐܗܐ ܐܬܚܠܦܘܬܐ. ܗܘܝܐ ܕܡܫܬܘܚܠܦܐ ܕܗܘܪܢܐ ܘܚܘܠܦܐ. ܟܕ ܦܝܫܬܐ ܡܫܘܚܠܦܬܐ. ܘܗܝ ܥܒܝܪܬܐ. ܟܕ ܐܝܟܐ ܡܫܬܘܚܠܦܐ ܗܕܝ ܦܝܫܬܐ ܥܒܝܪܬܐ. ܘܟܕܝ ܥܠ ܗܝ ܚܝܠܐ ܕܚܕܒܪܐ. ܐܬܝ ܠܦܘܬ ܐܗܐ ܐܘܪܚܐ ܠܦܝܫܬܐ ܐܚܪܬܐ ܥܒܝܪܬܐ ܐܠܗ. ܗܟܢܐ ܒܬܪ ܐܬܝܐ ܥܒܘܪܘܬܐ ܕܥܨܒܐ ܠܡܪܚܘܩܬܐ ܕܥܒܪܬܐ ܥܨܒܢܝܬܐ ܐܚܪܢܐ (٦ ـ ٦) .

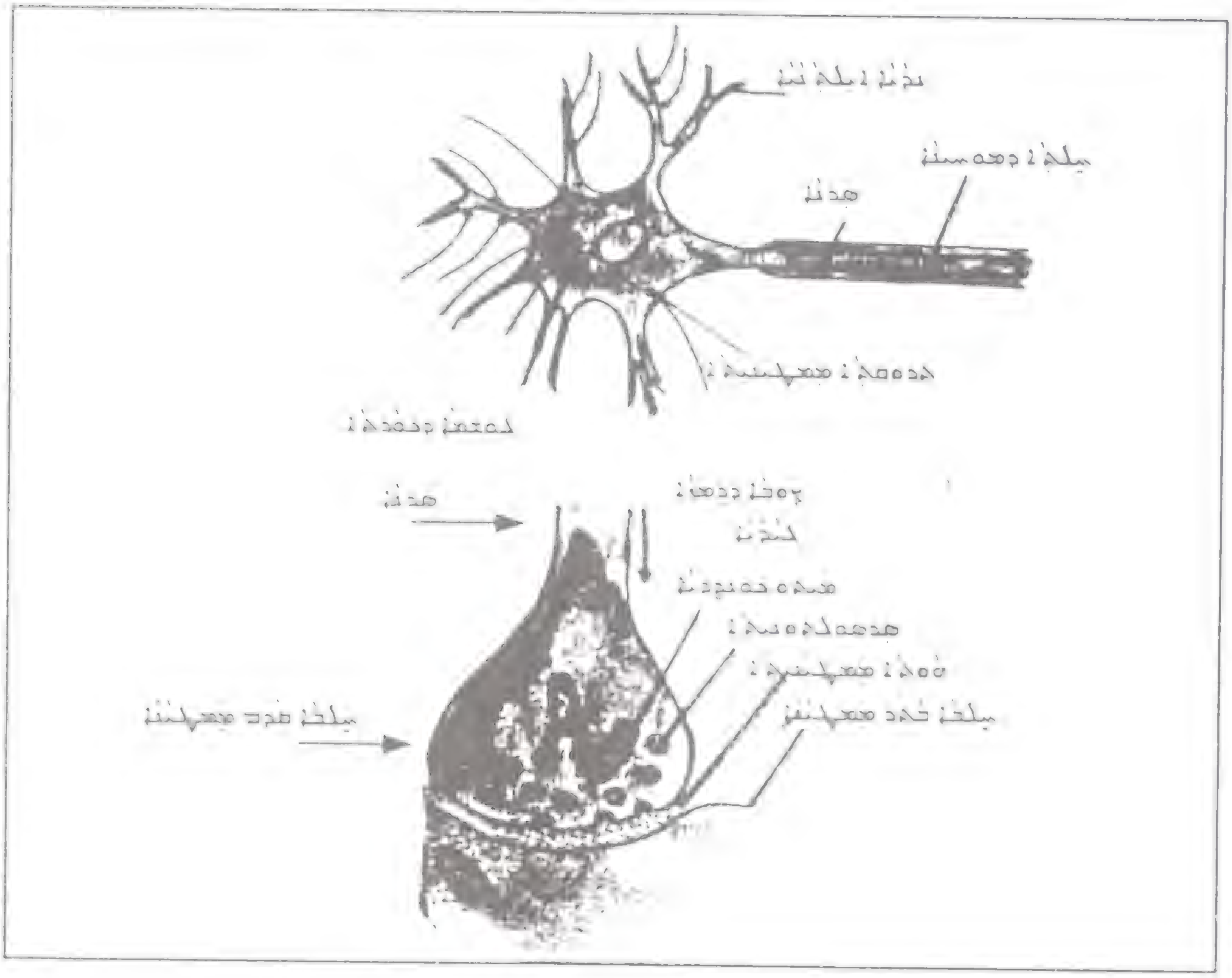


ܨܘܪܬܐ (٦ ـ ٦) ܪܕܝܬܐ ܕܪܡܙܐ ܥܠ ܐܪܝܟܘܬܐ ܕܓܕܠܐ ܥܨܒܢܝܐ.

٤ ـ ٥ ـ ٤ ـ ܥܒܘܪܐ ܕܪܡܙܐ ܒܝܢ ܬܪܬܝܢ ܚܘܠܝܬܐ ܥܨܒܢܝܬܐ :

ܐܢ ܕܦܪܫܝܢܢ ܠܗܘܢ ܠܡܘܕܥܬܐ ܕܥܒܘܪܐ ܕܪܡܙܐ ܥܨܒܢܝܐ ܒܝܢ ܬܪܬܝܢ ܚܘܠܝܬܐ ܥܨܒܢܝܬܐ ، ܗܠܐ ܥܠܝܢ ܕܢܕܥ ܠܡܦܪܫܢܘܬܐ ܕܦܓܥܬܐ ܕܚܘܠܝܬܐ ܥܨܒܢܝܬܐ (Synapse) ܦܓܥܬܐ ܕܡܫܬܪܝܐ ܠܗ ܦܪܘܣܐ ܚܘܬܡܐ ܕܦܪܕܐ ܕܚܘܠܝܬܐ ܥܨܒܢܝܬܐ ܡܢ ܢܦܩܐ ܐܟܣܘܢܝܐ ، ܐܘ ܠܦܘܡܐ ܕܚܘܠܝܬܐ ܥܨܒܢܝܬܐ ܐܚܪܝܬܐ. ܦܪܝܫܬܐ ܐܝܠܗ ܐܝܟ ܦܓܥܬܐ ܟܡܐ ܕܟܐܢܐ ܐܠܗ :

ܐ ـ ܚܘܬܡܐ ܕܦܪܘܣܐ ܥܘܠܡܐ ܗܘ ܢܦܝܫܐ ܡܠܝܠ ، ܘܡܬܚܙܐ ܠܡܘܕܥܢܘܬܐ ، ܘܥܠ ܟܝܢܐ ܐܝܟ ܕܡܚܘܐ ܚܕ ܡܠܘܐܐ ܟܝܡܝܝܐ ، ܐܝܟ ܠܗ ܚܕܐ ܥܒܪܬܐ ܕܪܡܙܐ ܡܢ ܚܘܠܝܬܐ ܡܕܥܝܬܐ ܠܚܘܠܝܬܐ ܐܚܪܝܬܐ. ܐܝܟ ܡܠܘܐܐ ܕܨܒܝܬ ܒܗܠܝܢ ، ܘܡܫܘܕܥܐ ܐܠܗ ܒܡܘܒܠܐ ܟܝܡܝܝܐ. ܦܬܐ ܡܢܗ ܐܝܬ ܟܝܢܐ ܦܪܣܘܠܘܓܝܐ ܡܫܟܚܢܝܐ (ܨܘܪܬܐ ٦ ـ ٧).



ܨܘܪܬܐ (٦ — ٧) ܡܫܘܕܥܐ ܠܥܩܒܬܐ ܕܥܘܪܘܠܐ ܥܨܒܝܐ

ܒ ـ ܐܝܬܘܬܐ ܕܐܘܪܥܬܐ ܡܥܘܡܘܬܐ ܫܘܦܐ ܡܨܦܝܢܝܬܐ ܥܡ ܗܪܓܐ ܚܘܪܓܐ .

ܓ ـ ܐܝܬܘܬܐ ܕܚܝܠܬܐ ܩܕܡ ܡܨܦܝܢܐ . ܚܠܝܦܐ ܡܠܝܠ ܟܠܝܬܐ ܗܪܓܐ ܡܢ ܫܘܦܐ ܡܨܦܝܢܝܬܐ . ܘܡܢ ܬܡ ܚܝܠܬܐ ܕܐܘܪܥܬܐ ܥܨܒܝܬܐ ܗܪܓܝܬܐ .

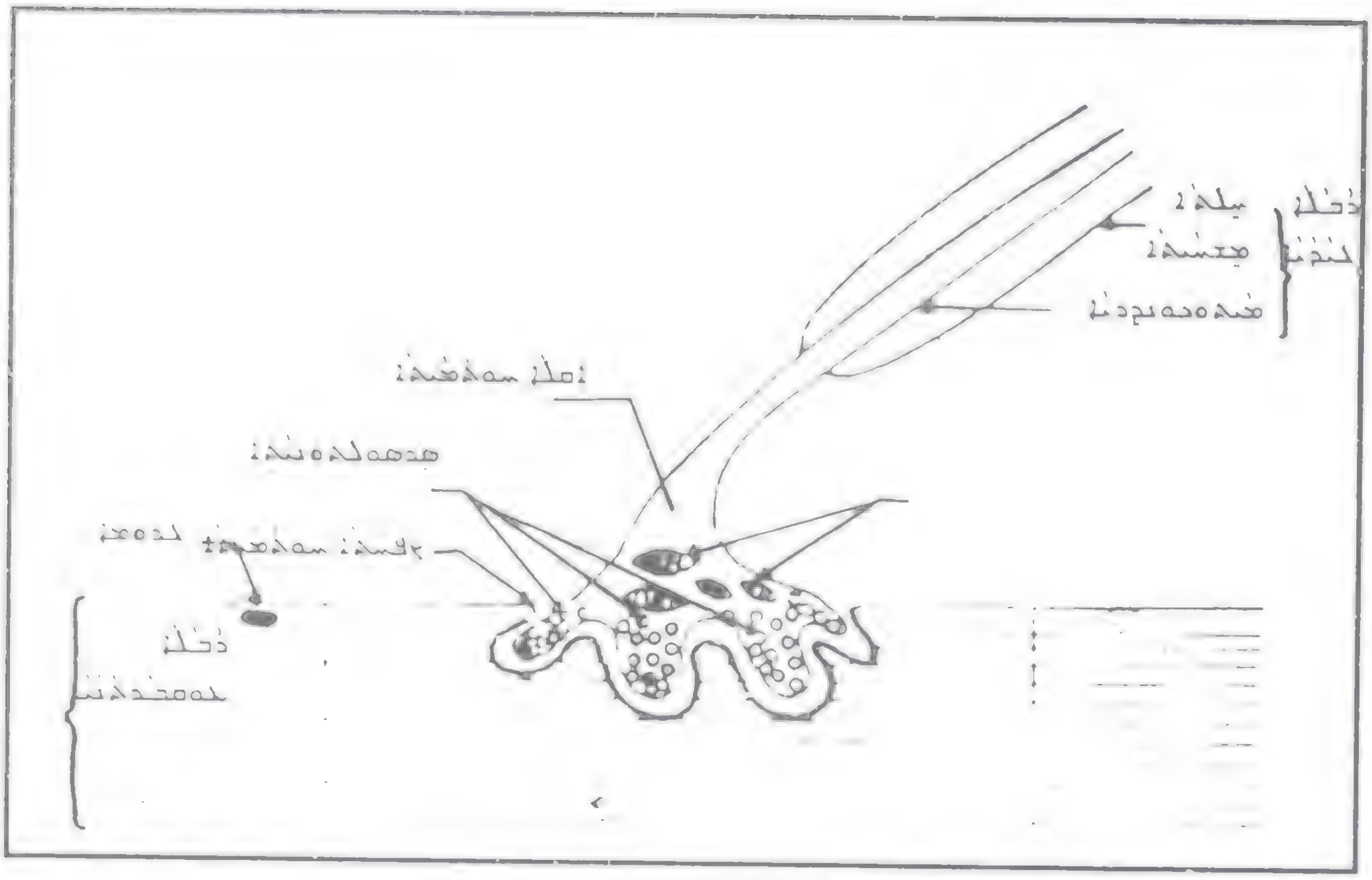
ܟܕ ܗܪܓܐ ܕܡܨܝܢܬܐ ܕܐܡܪܐ ܥܨܒܐ ܠܦܪܟܘܣܐ ܚܘܬܡܝܐ ܕܗܪܓܐ ܕܐܘܪܥܬܐ ܥܨܒܝܬܐ ܡܕܡܝܬܐ . ܦܡܟܝ ܗܪܫܘܠܬܘܢܐ ܡܨܦܝܢܝܬܐ . ܐܫܝܪܐ ܟܠܝܬܐ ܕܐܘܪܥܬܐ ܟܥܩܒܬܐ ܕܥܘܪܘܠܐ ܥܨܒܝܐ . ܘܪܟܝ ܠܣܝܡܘܬܗܘܢ ܡܢ ܡܠܘܐܐ ܡܘܟܠܬܐ ܟܝܡܝܝܐ ܠܗ ܫܘܦܐ ܡܨܦܝܢܝܬܐ . ܦܪܫ ܡܘܟܠܬܐ ܟܝܡܝܝܐ ܡܢ ܥܨܒܐ ܕܐܘܪܥܬܐ ܡܕܡܝܬܐ . ܟܕ ܡܪܬܐ ܡܥܘܡܬܐ ܠܥܨܒܐ ܕܐܘܪܥܬܐ ܗܪܓܝܬܐ ܟܕ ܡܠܝܠ ܡܥܘܡܬܐ . ܡܬܟܢܫ ܡܠܘܐܐ ܕܡܘܟܠܬܐ ܟܝܡܝܝܐ ܥܠ ܓܠܝܘܬܐ ܕܚܝܠܬܐ ܩܕܡ ܡܨܦܝܢܐ . ܘܦܬܚ ܬܪܥܐ ܠܐܝܘܢܐ ܕܨܘܕܝܘܡ (Na⁺) ܥܠܡܬܐ ܕܡܫܡܠܝܘܬܐ) .

ܐܝܟ ܐܣܘܬܐ ܕܙܘܕܝܢܘܡ ܠܓܘ ܚܘܪܕܐ ܥܨܒܢܝܬܐ ܡܪܟܢܝܬܐ . ܘܡܥܒܪ
ܠܗ̇ ܚܕ ܪܡܙܐ ܥܨܒܢܝܐ ܚܕܬܐ . ܒܫܘܪܝܐ ܐܝܟ ܠܗ ܚܝܠܐ ܕܚܘܪܕܐ .

٤ . ٥ . ٥ ـ ܫܘܢܝܐ ܕܪܡܙܐ ܥܨܒܢܝܐ ܡܢ ܚܘܪܕܐ ܥܨܒܢܝܬܐ ܠܚܘܪܕܐ ܫܘܡܟܪܢܝܬܐ :

ܡܫܢܝܐ ܪܡܙܐ ܥܨܒܢܝܐ ܡܢ ܚܘܪܕܐ ܥܨܒܢܝܬܐ ܠܚܘܪܕܐ ܫܘܡܟܪܢܝܬܐ . ܡܢ ܠܗ ܪܘܟܒܐ ܡܫܘܡܠܝܐ ܡܫܚܠܦܘܬܐ ܫܘܡܟܪܢܝܬܐ . ܥܨܒܢܝܬܐ (Myoneural Junction) . ܘܠܗܘܢ ܡܬܩܪܝܢ ܦܪܟܘܣܐ ܣܘܟܠܝܐ ܠܦܪܬܐ ܕܚܘܪܕܐ ܥܨܒܢܝܬܐ . ܡܢ ܫܘܚܠܦܐ ܕܪܒܝܐ ܫܘܡܟܪܢܝܬܐ ܘܡܠܝܐ ܐܣܝܡܬܐ (٦ - ٨) . ܘܐܝܟ ܗܘܬܐ ܚܢ ܓܪܓܝ ܚܘܪܕܐ ܡܕܘܡܝܬܐ ܠܗܘܬܐ ܡܡܠܠܝܬܐ . ܘܡܬܩܠܝܢ ܚܝܠܐ ܕܪܒܝܐ ܫܘܡܟܪܢܝܬܐ ܒܐܘܪܚܐ ܦܫܝܛܬܐ . ܘܡܦܩܝܢ ܡܣܘܒܗ ܦܠܘܚܐ ܫܘܡܟܪܢܝܬܐ ܘܠܪܘܡܐ ܕܪܒܝܐ ܥܝܪܢܝܬܐ ܕܡܠܠܬܐ ܕܪܡܙܐ ܥܨܒܢܝܐ ܠܫܘܠܡܐ ܕܦܪܟܘܣܐ ܣܘܟܠܝܐ . ܦܫܛܝܢ ܡܪܫܘܠܬܘܬܐ ܡܡܠܠܝܬܐ ܕܐܝܟ ܠܗܘܢ . ܘܕܠܝܢ ܕܥܒܕܐ ܚܝܠܐ ܦܠܘܚܐ . ܘܪܦܝܢ ܠܫܒܝܩܘܬܗܘܢ ܡܢ ܡܘܬܠܝܐ ܚܫܝܫܐ ܠܗ ܗܘܬܐ ܡܡܠܠܝܬܐ . ܓܒܝܢ ܡܠܘܐܐ ܕܡܘܬܠܝܐ ܚܫܝܫܐ ܥܠ ܚܝܠܐ ܕܪܒܝܐ ܫܘܡܟܪܢܝܬܐ ܒܝܕܝܐ ܪܡܘܙܠܝܐ . ܘܓܒܝܢ ܠܗ ܥܝܠܝܐ ܠܐܣܘܬܐ ܕܙܘܕܝܢܘܡ . ܘܚܪܘܦ ܠܓܘ ܚܘܪܕܐ ܫܘܡܟܪܢܝܬܐ . ܘܪܡܙܐ ܥܨܒܢܝܐ ܚܕܬܐ . ܐܝܟ ܠܗ ܥܝܠܝܐ ܕܪܒܝܐ ܫܘܡܟܪܢܝܬܐ . ܘܡܬܝܪ ܠܓܪܡܐ ܕܡܦܫܘܬܐ ܫܘܡܟܪܢܝܬܐ .

ܚܪܢ ܡܘܬܠܝܐ ܚܫܝܫܐ ܬܪܬ ܡܢܗܘܢ ܒܫܘܠܚܢܗ . ܒܡܟܪܟܢܘܬܐ ܕܚܕ ܐܢܘܫܐ ܦܪܝܫܐ . ܡܢܠܝܐ ܠܫܘܠܚܢܗ ܐܡܝܢܝܐ . ܘܦܢܝܬܐ ܕܪܒܝܐ ܒܡܟܢܘܬܐ ܕܡܦܫܘܬܐ ܐܡܝܢܬܐ .



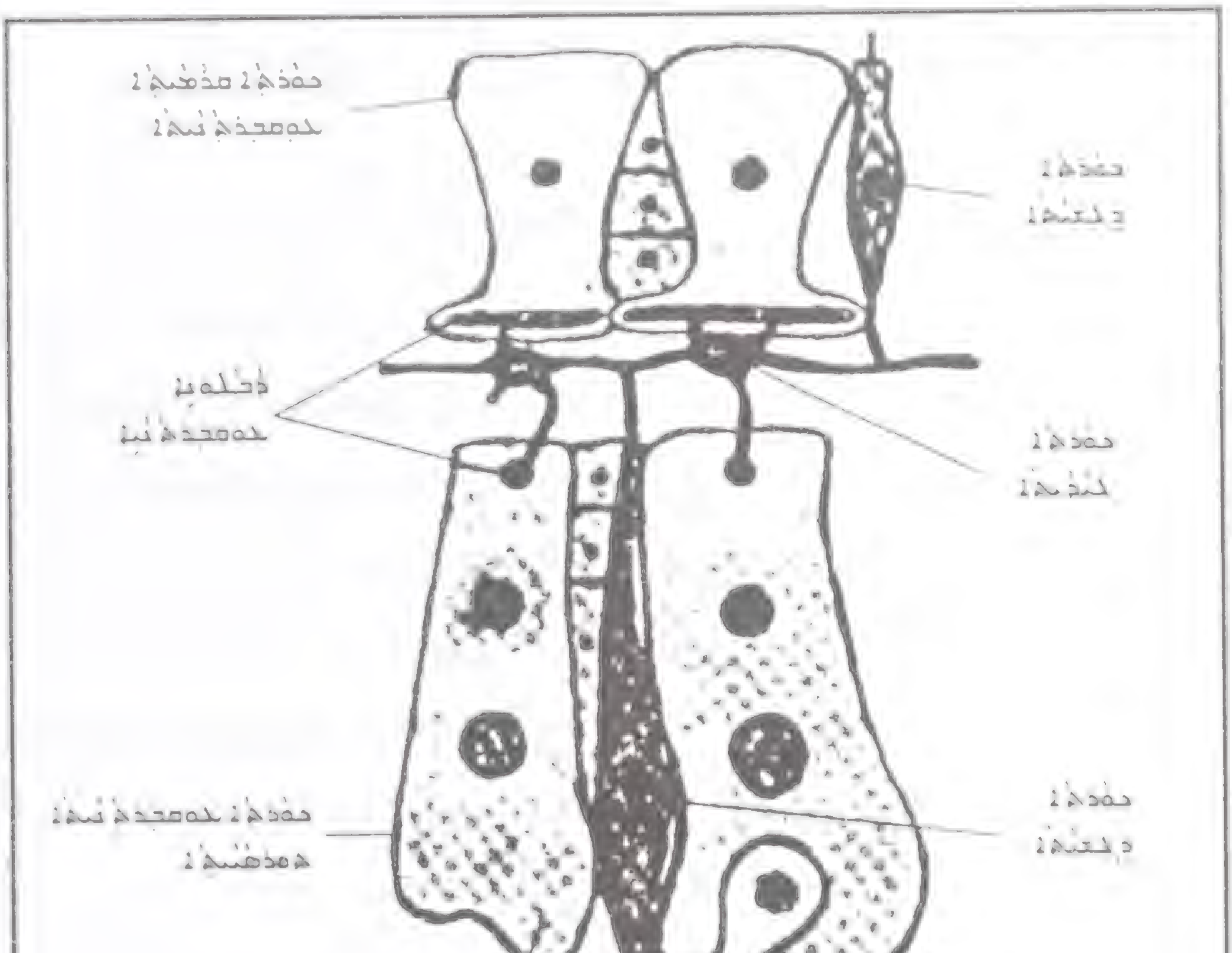
ܨܘܪܬܐ (٦ ـ ٨) ܡܘܬܒܐ ܚܘܫܒܢܝܐ ـ ܥܨܒܢܝܐ

٤ ـ ٦ ـ ܚܝܘܬܐ ܠܐ ܦܩܪܐ :

ܠܝܬ ܐܘܪܓܢܐ ܥܨܒܢܐ ܦܪܝܫܐ ܠܚܝܘܬܐ ܠܐ ܦܩܪܐ . ܐܠܐ ܐܝܬ ܚܕ ܚܘܢܝܐ ܡܢ ܚܘܠܝܐ ܪܓܫܢܝܐ ܘܥܨܒܢܝܐ . ܘܪܒܐ ܩܠܝܠ ܥܘܕܐ ܠܡܬܠܬܐ ܕܡܘܗܪܝܐ ܘܡܬܝܢܬܐ ܐܝܟ ܒܨܘܪܬܐ ܚܕܝܬܐ . ܟܕ ܡܢ ܦܬܝܬܐ ܕܦܐܬܐ ܕܓܠܕܐ ܚܘܠܝܐ ܚܘܫܢܝܐ ܨܘܪܬܐ . ܫܒܝܠܝܢ ܠܓܘܐ ܘܪܒܝܢ ܥܡ ܫܠܡܐ ܪܓܫܢܝܬܐ . ܘܦܪܫ ܐܝܟ ܚܘܠܝܐ ܚܕܪ ܦܘܡܐ . ܘܠܗ ܡܫܠܚܐ ܘܐܨܛܠܝܐ ܡܫܚܠܦܐ . ܘܡܬܚܝܢܬܐ ܠܗ ܚܘܠܡܢܐ ܠܗ ܥܒܘܪܐ ܪܘܫܡܐ ܕܪܓܫܬܐ . ܐܝܟ ܒܡܘܪܫܐ ܩܠܝܠܬܐ . ܡܛܠ ܡܫܡܥܢܐ ܕܐܝܬ ܚܘܠܝܐ ܪܓܫܢܝܐ ܡܚܝܕܝܢ ܒܚܘܠܝܐ ܥܨܒܢܝܐ . ܘܡܬܩܪܝܢ ܓܪܕܐ ܥܨܒܢܝܐ (Nerve net) ܠܗ ܥܒܘܪܐ ܕܦܐܬܐ ܕܓܠܕܐ . ܡܘܪܝܐ ܠܓܘܫܡܐ ܡܝܘܟܢܐ (ܡܝܙܘܓܠܝܐ Mesoglea) .

ܫܪܝܪ ܚܘܠܝܐ ܥܨܒܢܝܐ ܥܠ ܡܚܫܒܐ ܐܨܛܠܘܢܝܐ ܫܦܝܐ ܠܐ ܦܪܝܫܐ ܠܫܪܝܐ ܘܡܘܬܒܐ . ܘܡܛܠ ܗܢܐ ܡܚܫܒܐ ܒܚܘܠܝܐ ܪܓܫܢܝܐ ܡܢ ܓܘܫܡܐ . ܘܪܒܬܐ ܚܘܫܒܢܝܬܐ ܕܐܝܬ ܠܗ ܚܘܠܝܐ ܡܪܡܝܢܐ ܚܘܫܒܢܝܬܐ ܡܢ ܓܘܫܡܐ ܐܚܪܢܐ . ܘܚܝܕܘܬܐ ܠܗܘܐ ܡܛܠ ܚܘܠܝܐ ܪܓܫܢܝܐ ܡܚܝܕܝܢ ܥܡ ܪܒܬܐ ܚܘܫܒܢܝܬܐ . ܘܫܪܒܐ ܬܪܝܢ ܡܢ ܐܝܟ ܗܘܝܢܐ (ܚܘܠܝܐ ܪܓܫܢܝܐ ܘܥܨܒܢܝܐ ܘܪܒܬܐ ܚܘܫܒܢܝܬܐ) ܐܪܓܢܘܬܐ ܪܓܫܢܝܬܐ ܘܡܚܫܬܐ

ܠܒܪܝܬܐ (Sensor neuromotor mechanism) . ܘܡܫܡܫ ܣܘܪܕܐ ܕܪܓܫܬܐ
ܟܡܦܠܬܐ ܕܡܘܗܪܐ ܪ̈ܓܫܐ . ܘܡܫܡܫܝܢ ܠܗܘܢ ܠܣܘܪܕܐ ܠܒܪܝܬܐ . ܕܡܫܡܫ
ܡܫܠܡܗܘ ܠܪܡܙܐ ܠܒܪܝܐ . ܡܢ ܒܬܪ ܕܐܬܐ ܠܗ ܠܡܘܚܕܬܢܝܬܐ ܕܐܬܡܫܬܐ
ܕܡܘܦܩ ܠܡܦܠܬܐ (ܡܪ̈ܟܒܬܐ) ܡܣܒܣܬܐ . ܐܝܟ ܡܦܫܘܬܐ ܐܘ ܡܬܚܝܘܬܐ .
ܡܪܕܝܬܐ ܒܡܣܠܦܐ ܕܐܬܡܫܬܐ ܕܠܘܚܐ ܐܘ ܡܫܚܐ . ܘܡܦܫܡܘܬܐ ܠܒܪ
ܚܘܬܐ ܡܬܒܢܝܐ ܡܬܦܕܪܘܬܐ . ܦܬܐ ܠܗ ܡܘܟܢܐ ܡܢ ܕܐܝܟ ܠܗ ܡܣܕܪܐ
ܚܕ ܐܘܪܚܐ ܠܒܪܝܐ ܒܪܘܢܐ . ܒܝ ܠܗ ܡܦܕܪܐ ܠܒܪܝܐ ܐܘ ܕܡܬܒܢܝܐ . ܐܝܟ
ܐܢ ܕܐܝܟ ܠܗ ܒܘܠܒܠܐ ܘܡܬܕܒܪ ܡܢ ܚܘܬܐ ܡܬܒܢܝܐ ܒܠܘܬܐ ܐܬܡܫܬܐ
(٦ ـ ٩) .



ܐܬܡܫܬܐ (٦ ـ ٩) ܗܘܬܐ ܡܢ ܡܬܦܠܓܬܐ ܐܕܫܘܬܢܝܬܐ ܠܗ ܠܣܘܪܐ ܕܡܣܕܪܐ
ܡܫܘܪܐ ܠܐܬܡܫܬܐ ܕܪܓܫܬܐ ܠܒܪܝܬܐ ܘܡܬܝܬܐ .

٤ ـ ٧ ـ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܓܘ ܦܘܠܓܢܐ ܚܝܘܬܢܝܐ :

ܗܘܐ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܓܘ ܦܘܠܓܢܐ ܕܐܕܫܐ ܫܚܠܦ ܒܠܚܘܕܝܘܬܐ ܘܒܦܫܝܛܘܬܐ . ܡܢ ܡܛܠ ܕܒܝܬܗ ܠܗ ܗܡܕܐ . ܘܡܬܦܠܓܐ ܒܝܬܗ ܡܩܠܝܬܐ ܠܬܪܝܢ ܗܘܢܝܐ ܕܪܫܝܐ ܒܝܬܗ : ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܡܪܟܙܢܝܐ ܘܐܘܪܓܢܐ ܥܨܒܢܝܐ ܣܚܪܢܝܐ .

٤ ـ ٧ ـ ١ ـ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܡܪܟܙܢܝܐ :

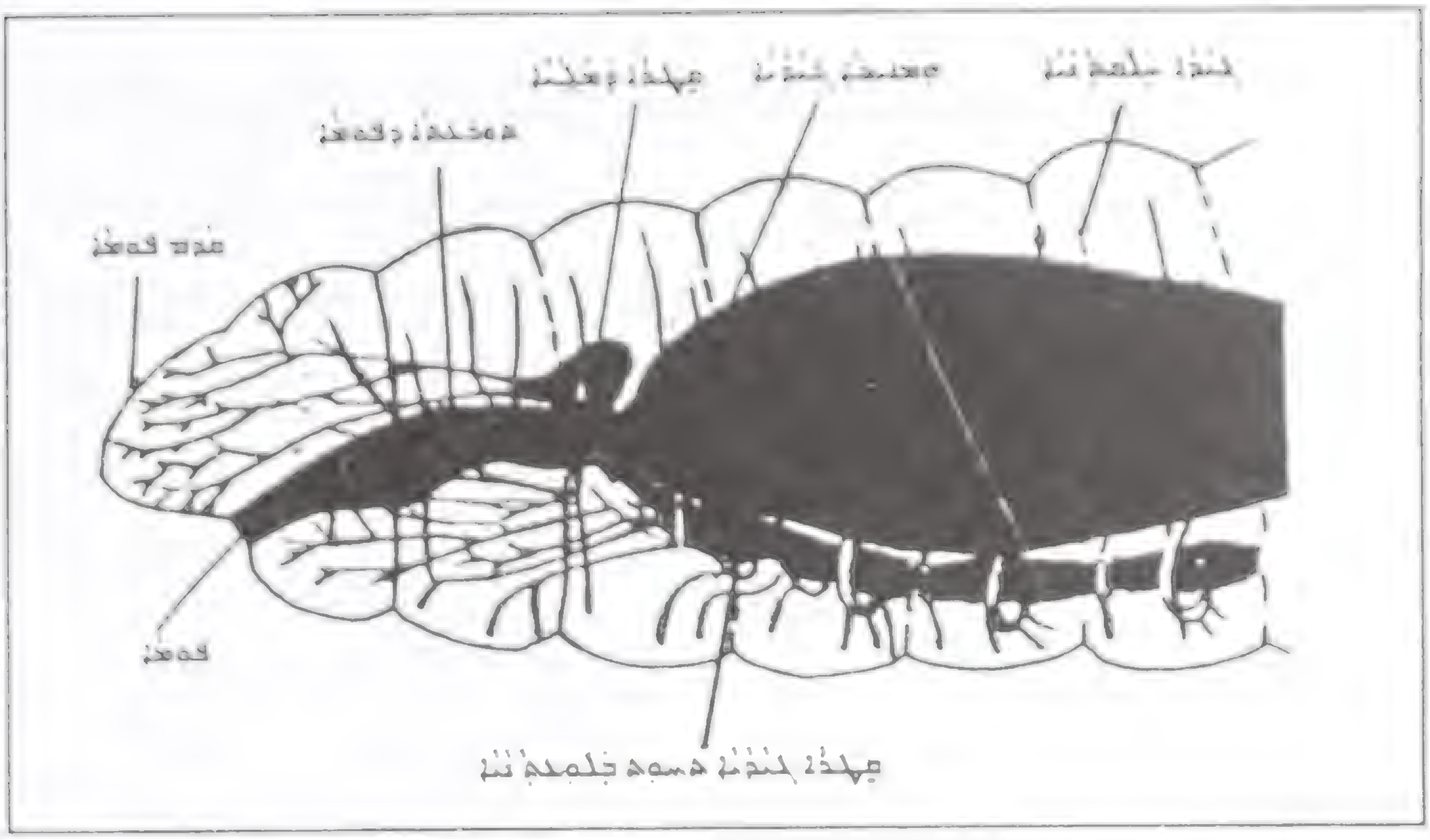
ܡܛܠ ܕܠ ܟܠܘܡܕܐ ܠܗ ܚܠܡܬܐ ܠܡܥܡܕܐ ܗܠܝܡܬܐ . ܒܝܬܗ ܘܗܠܝ ܡܢ ܡܪܟܙܐ ܥܨܒܢܝܐ ܡܫܘܡܫܐ ܕܠ ܟܠܘܡܕܢܝܐ (Supraphryngeal ganglia) ܐܘ ܩܕܡܝܐ . ܐܦܝܕܐ ܒܝܬܗ ܩܕܡܝܐ ܚܕ ܡܪܟܙܐ ܥܨܒܢܝܐ . ܡܬܥܒܪܐ ܡܢ ܗܕܝ ܡܟܝܠܐ . ܡܛܠ ܗܘܝ ܟܠܘܡܕܐ ܡܚܕܪܢܝܐ . ܘܒܝܬܗ ܡܪܟܙܐ ܗܘܝ ܟܠܘܡܕܐ ܬܚܝܬܝܐ ܕܚܕ ܐܦܝܕܐ ܥܨܒܢܝܐ ܚܕܐ (Subpharyngeal ganglia) ܟܠܘܡܕܢܝܐ (ܩܕܡܝܐ ܥܨܒܢܝܐ) . ܡܛܝ ܚܕܐ ܟܠܘܡܕܐ ܡܢ ܗܕܝ ܠܥܠܝܐ ܠܥܠܝܐ ܗܘܝܢ ܡܢܗ ܠܗ ܚܠܡܬܐ ܠܡܥܡܕܐ ܕܥܠܝܬܐ . ܘܡܛܝ ܡܢ ܐܘ ܡܪܟܙܐ ܚܒܠܐ ܥܨܒܢܝܐ ܘܗܠܝܢ ܥܠ ܐܪܥܝܘܬܐ ܕܠܥܠܝܐ ܕܪܡܝܐ ܠܗܘܕܟܐ ܠܡܥܡܕܐ . ܗܠ ܕܩܠܝܠ ܒܚܠܡܬܐ ܐܚܪܢܝܐ ܡܢ ܠܡܥܡܕܐ . ܡܛܝ ܐܘ ܚܒܠܐ ܒܟܠ ܚܠܡܬܐ ܡܬܕܘܪܐ ܚܕ ܡܪܟܙܐ ܥܨܒܢܝܐ . ܘܚܕܐ ܚܒܠܐ ܥܨܒܢܐ ܥܨܒܢܝܐ ܡܢ ܗܕܝܐ ܕܡܘܕܥܐ ܥܨܒܢܝܐ . ܐܝܟܐ ܡܪܟܙܐ ܥܨܒܢܝܐ ܕܐܝܬ ܠܗܘ . ܒܝܬܗ ܚܕ ܡܘܢܐ ܕܡܪܟܙܢܝܐ ܕܡܘܕܥܐ ܥܨܒܢܝܐ ܒܚܝܘܬܐ .

٤ ـ ٧ ـ ٢ ـ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܣܚܪܢܝܐ :

ܡܬܥܒܪܐ ܒܝܬܗ ܐܘ ܗܘܡܐ ܡܢ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܡܢ ܡܢܝܢܐ ܕܗܘܡܐ ܒܝܬܗ

ܐ . ܐܪܒܥܐ ܥܨܒܐ ܡܬܚܝܢ ܡܢ ܩܕܡܝܐ ܠܡܫܡܫܘܬܐ ܕܦܘܠܚܢܐ .

ܒ . ܚܕ ܙܘܓܐ ܡܢ ܥܨܒܐ ܟܪܝ ܡܢ ܩܕܡܝܐ ܥܨܒܢܝܐ ܐܚܪܢܐ (٦ ـ ١٠)



ܐܣܟܡܐ (٦ - ١٠) ܚܘܡܬܐ ܠܡܕܡܝܬܐ ܡܢ ܐܘܪ̈ܚܬܐ
ܓܝܕ̈ܐ ܠܡܘܠܟܬܐ ܕܪ̈ܕܝܐ .

ܒ - ܗܠܝܢ ܙܘܓܐ ܡܢ ܓܝܕ̈ܐ ܕܩܢܝܐ ܦܪܫܝܢ ܒܟܠ ܣܝܦܘܬܐ ܕܚܘܛܡܐ ܡܢ ܡܨܥܬܐ ܓܝܕ̈ܐ ܒܪ̈ܫܢܐ . ܘܦܫܝܢ ܦܠܝܓܐ ܠܗ ܣܝܦܘܬܐ . ܕܢܦܠ ܒܠ ܙܘܓܐ ܡܢܝܫ ܒܫܘܡܐ ܠܡܕܡܝܬܐ . ܘܗܕܝ ܙܘܓܐ ܡܕܝܓܐ ܒܫܘܡܐ ܒܫܡܪܝܐ . ܡܢܝܫ ܒܠ ܓܝܕܐ ܟܠ ܗܕܝ ܓܢܒܝܐ ܕܦܠܓܐ ܕܣܝܦܘܬܐ . ܗܝ ܕܢܦܠ ܠܗܘܢ . ܒܝܫ ܦܪܝ ܝܪܡܬܐ ܠܘܡܒܪܟܬܐ ܡܦܪܝܫܬܐ ܠܓܘܪܐ ܕܦܓܪܐ . ܟܕ ܡܦܪܘܫܐ ܗܕܝ ܐܪܒܥܐ ܡܢ ܪ̈ܓܠܐ ܒܓܘܫ :

١ - ܪ̈ܓܠܐ ܓܝܕ̈ܢܝܐ ܪ̈ܓܫܢܝܐ (Sensory Nerve Fibres) :

ܘܫܡܥܝܢ ܒܡܫܢܝܬܐ ܕܝܫܥܬܐ ܡܢ ܦܓܪܐ ܕܝܠܕܐ ܠܣܒܠܐ ܓܝܕ̈ܐ ܒܪ̈ܫܢܐ .

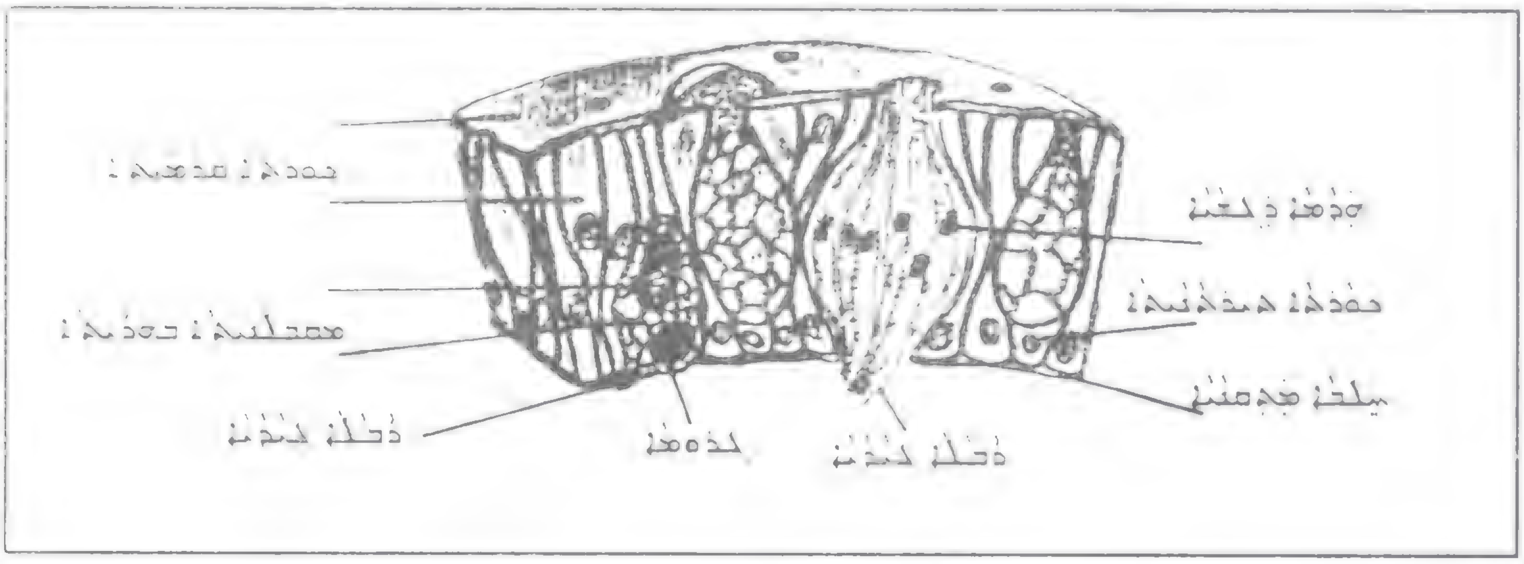
٢ - ܪ̈ܓܠܐ ܓܝܕ̈ܢܝܐ ܙܘܥܢܝܐ (Motor Never Fibres) :

ܡܫܢܝܢ ܦܘܡܕܐ ܡܢ ܣܒܠܐ ܓܝܕ̈ܐ ܒܪ̈ܫܢܐ ܠܟܘܡܒܪܬܐ ܕܚܘܛܡܐ ܘܡܪܘܡܬܐ ܕܦܓܪܐ ܕܝܠܕܐ . ܘܡܝܫ ܡܢ ܐܒܐ ܓܝܕ̈ܐ ܕܩܢܝܐ ܦܪܝܓܐ ܦܪܫܝܢ ܠܗ ܗܘܡܐ ܕܢܘܦܩܐ (ܝܒܪܒܪܐ) ܘܡܒܫܐ ܕܟܠܒܝܐ . ܘܗܘܡܐ ܕܚܘܛܡܐ ܐܣܪܝܐ .

٤ - ٧ - ٣ ـ ܗܘܡܐ ܕܪ̈ܓܫܐ :

ܣܒܝܬܐ ܝܪܡܬܐ ܕܦܓܪܐ ܕܝܠܕܐ ܠܗ ܡܘܠܟܬܐ ܕܪܕܝܐ ܟܠ ܒܡܢܝܢܐ ܡܢ ܗܘܡܐ ܪ̈ܓܫܢܐ . ܡܕܝܓܐ ܣܠܗ ܒܠ ܒܡܢܝܢܐ ܡܢܝܫ ܒܚܘܕܪܐ ܕܝܠܢܝܬܐ . ܢܦܠܝܢ

ܐܝܬ ܒܗܘܢ ܪ̈ܓܫܐ ܒܡܣܬܒܠܢܘܬܐ ܘܐܣܝܪܬܐ ܕܢܘܗܪܐ ܒܓܘܪܬܐ ܪ̈ܓܝܫܬܐ. ܐܦ ܡܢܘ̈ܬܐ ܡܠܝܬ ܚܘܫܒܣܘܣ ܒܗ ܦܝܫܬܐ ܙܥܘܪܬܐ ܠܟܠ ܚܠܘܬܐ. ܘܒܗ ܗܘܪܒܬܐ ܦܘܫܟܬܐ. ܐܘ ܒܗ ܦܝܫܬܐ ܕܢܘܗܪܐ ܠܠܒܫܬܐ ܠܟܘܠܗ ܕܡܣܒܘܪܐ. ܐܝܟ ܒܗ ܥܠ ܚܘܪܬܐ ܕܪ̈ܓܫܬܐ ܠܐܝܬ ܒܗܘܢ. ܚܕܐ ܕܡܝܬܐ ܡܕܡܝܢܐ ܠܟܘܒܐ. ܡܓܝܢܐ ܡܢ ܒܗ ܚܕ ܦܚܡܐ ܕܠܬܢܐ ܒܗ ܟܕܡܬܐ ܕܡܦܬܓܠ. ܗܝ ܕܡܕܒܪܐ ܢܘܗܪܐ. ܘܐܗܕܐ ܢܦܬܡܢܐ ܡܫܘܚܬܐ ܕܡܢܕ ܪ̈ܓܫܐ ܓܢܝܢܐ. ܐܦ ܐܝܟ ܚܕܢܝܐ ܠܪ̈ܓܫܐ ܓܢܝܐ. ܦܪܝܫܬܐ ܒܝܢ ܚܘܪܬܐ ܕܘܡܘܪܐ ܡܪ̈ܡܢܐ ܨܘܪܬܐ (٦ ـ ١١).



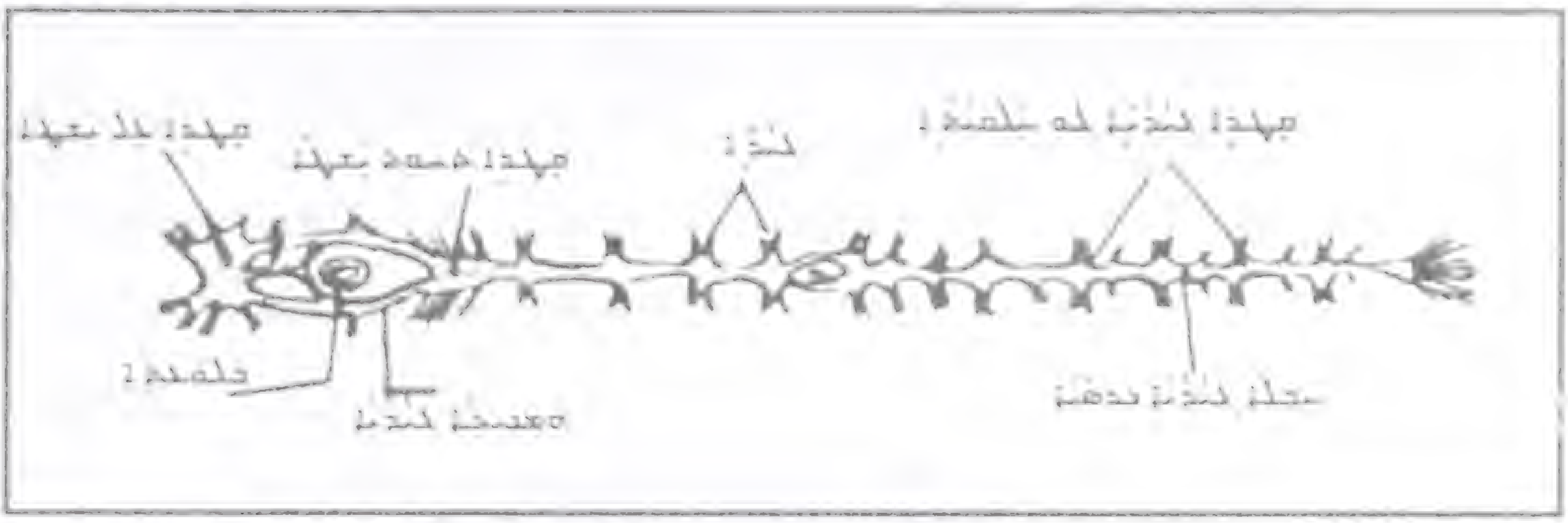
ܨܘܪܬܐ (٦ ـ ١١) ܗܕܡܐ ܕܪ̈ܓܫܐ ܒܗ ܬܘܠܥܬܐ ܕܐܪܥܐ

ܬܘܠܥܬܐ ܕܐܪܥܐ ܐܝܬ ܠܗ ܚܘܪܬܐ ܕܠܬܢܐ ܠܡܩܒܠܬܐ ܕܢܘܗܪܐ ܢܘܗܪܐ (Photoreceptor cells) ܦܪܝܫܢ ܒܝܢ ܚܘܪܬܐ ܕܡܟܣܝܬܐ ܕܓܠܕܐ ܕܓܘܫܡܐ. ܒܡܣܬܒܠܢܘܬܐ ܘܐܣܝܪܬܐ ܕܢܘܗܪܐ. ܘܗܢܝܢ ܐܝܬ ܚܘܪܬܐ ܡܡܘܫܚܬܐ ܒܦܘܡܐ ܕܢܦܩ ܡܢ ܦܘܡܐ (Prostomium). ܘܒܗ ܚܠܘܬܐ ܠܡܕܡܝܢܬܐ ܘܚܠܘܬܐ ܐܚܪ̈ܢܝܬܐ. ܘܗܢܝܢ ܐܝܬ ܚܘܪܬܐ ܕܢܘܗܪܐ ܠܓܘܪܐ. ܟܕ ܚܕܬܐ ܥܠ ܚܘܪܬܐ ܟܠ ܠܠܒܫܬܐ ܕܡܝܬܐ ܡܫܚܬܐ. ܡܦܩܢܐ ܠܘܠܒܐ ܒܢܘܗܪܐ ܢܦܠܐ ܡܢ ܙܘܓܐ ܡܫܠܡܐ. ܘܡܫܘܚܬܐ ܠܗܘܢ ܠܓܝܒ ܚܕ ܓܢܒܐ ܡܢ ܪ̈ܓܫܐ ܓܢܝܐ ܡܬܩܪܝܐ ܢܟܣܬܐ (Retunula) ܒܗ ܦܝܫܬܐ ܗܝ ܕܫܠܡܐ ܓܝܒܘ ܐܝܬ ܪ̈ܓܫܐ ܒܗ ܚܘܪܬܐ. ܫܘܚܠܦܐ ܚܢܐ ܪ̈ܓܫܐ ܓܢܝܐ ܗܘ ܡܫܬܠܡܐ ܒܝܘܪܐ ܠܓܘܪܐ.

٤ ـ ٨ ـ ܐܘܪ̈ܓܢܝܐ ܥܨܒ̈ܝܐ ܠܗ ܚܩ̈ܝܪܐ :

ܒܡܥܠܝ ܠܗ ܒܘܪ̈ܟܐ ܗܕܐ ܐܪ̈ܓܢܐ ܕܥ̈ܒܝܐ ܡܢ ܐܪ̈ܓܢܐ ܕܩܘܡܬܐ ܕܚ̈ܝܘܬܐ ܕܦܫܝܛܬܐ ܢܛܝܪ :

ܩܠܦܢ̈ܝܬܐ ܘܦܪ̈ܚܬܐ . ܘܚܕ ܡܢܗܘܢ ܠܟܠ ܐܪܓܢܐ ܚܕ ܠܘܦܬܐ .



ܨܘܪܬܐ (٦ ـ ١٢) ܐܘܪ̈ܓܢܐ ܥܨܒ̈ܝܐ ܠܣܪ̈ܛܢܐ ܕܢܗܪܐ

٤ ـ ٨ ـ ١ ـ ܩܠܦܢ̈ܝܬܐ :

ܡܬܚܙܐ ܐܘܪ̈ܓܢܐ ܥܨܒ̈ܝܐ ܠܗ ܣܪ̈ܛܢܐ ܢܗܪ̈ܝܐ (Cray Fish) ܒܨܘܪܬܐ ܕܢܦܫ ܚܠ ܢܘܗܪܐ . ܘܡܬܘܪܕܐ ܗܠܝܢ ܡܢ ܡܬܚܝ̈ܕܢܘܬܐ ܕܚܠܬܐ ܩܛܪ̈ܬܐ ܥܨܒ̈ܝܬܐ ܓܕܘ̈ܠܐ . ܡܬܦܪܫܢ ܡܢܗ ܐܕܝ̈ܠܐ ܘܝ̈ܠܐ ܡܢ ܥܨܒܐ ܦܪܫܝ ܠܗ ܕܥܐ ܚܢ̈ܕܐܝܬ ܒܡ ܩܛܪܐ ܚܕ ܘܝ̈ܠܐ ܡܢܗܘܢ ܒܬܪܝ ܠܥܘܦܪܐ . ܘܐܣܪ̈ܐ ܒܬܪܝ ܠܥܘܦܐ . ܘܝ̈ܠܐ ܡܠܝܬܐ ܒܬܪܝܢ ܢܒܝܬܐ . ܐܠܦܐ ܘܝ̈ܠܐ ܕܒܝܬܝ̈ܬܐ . ܐܝܟ ܕܩܛܪ̈ܬܐ ܒܩܛܪ̈ܬܐ ܥܨܒ̈ܝܬܐ ܡܘܚܐ ܢܘܗܪܐ . ܘܐܝܟ ܩܛܪܬܐ ܓܪܡܐ ܡܢ ܡܬܚܝ̈ܕܢܘܬܐ ܕܡܥܬܐ ܐܘ ܐܪܒܥܐ ܘܝ̈ܠܐ ܡܢ ܩܛܪ̈ܬܐ ܥܨܒ̈ܝܬܐ ܓܕܘ̈ܠܐ . ܘܓܪܝ ܡܢܗ ܘܝ̈ܠܐ ܡܢ ܥܨܒܐ ܠܟܠ ܡܢ ܢܘܦ̈ܐ ܦܘܡܐ . ܘܡܬܩܪܝܐ ܢܘܡܬܐ . ܘܡܬܡܩܪܒܢܘܬܐ ܠܡܢܝܬܐ . ܘܐܦ ܢܦܩ ܡܢܗ ܠܓܒ̈ܐ ܒܬܪܥܐ ܡܢ ܙܘܓܐ ܕܪܫܐ ܠܓܘܫܡܐ ܚܒܠܐ ܥܨܒܝܐ ܕܪܫܐ ܘܝ̈ܠܐ . ܥܠ ܚܕ ܩܛܪܬܐ ܥܨܒܝܬܐ . ܒܟܠ ܚܠܩܬܐ ܡܬܢܬܬܐ ܡܢ ܒܡܦܩܬܐ ܗܘ ܒܬܪܥܝܬܐ (ܨܘܪܬܐ ٦ ـ ١٢) . ܡܦܪܫܝܢ ܡܢ ܟܠ ܩܛܪܬܐ ܠܗ ܙܘܓܐ ܘܚܒܠܐ ܗܠܝܢ ܘܝ̈ܠܐ ܡܢ ܥܨܒܐ ܕܓܒܝܐ . ܘܫܠܝ . ܦܪܫܝ ܠܗ ܡܘܡܐ ܕܪܘܡܐ ܠܓܘܫܡܐ ܕܐܝܬ ܠܗ ܚܠܩܬܐ ܢܦܘܩܬܐ ܐܠܝܗ .

٤ . ٨ . ٢ . ܡܩܲܒܠܵܢܘܵܬܵܐ ܕܪܓܫܐ :

ܦܪ̈ܝܫܐ ܢܘܥ̈ܐ ܐܝܬܠܗ ܗܘܪܡܐ ܗܕܐ ܕܪܓܫܐ ܡܬܦܪܫܢܝܬܐ . ܡܢܝܢ ܕܡܢܘܪܗܠܗܘܢ ܒܪܫܘܡܬܐ ܒܪܝܐ ܕܒܐܬܪܐ ܗܢܐ :

١ . ܡܩܒܠܢܘܬܐ ܕܡܘܫܫܐ (Touch Receptors) :

ܡܫܘܚܐ ܠܗ ܥܠܝܗܐ ܕܡܘܫܫܐ ܒܡܫܘܬܦܢܘܬܐ ܒܡܫܘܚܬܐ ܫܠܝܚܢܘܬܐ . ܡܝܬܝܢ ܐܝܟ ܡܫܡܫܢܘܬܐ ܡܢ ܒܣܝܡܘܬܐ . ܗܘ ܕܒܪܝܬܐ ܠܗ ܒܡܘܫܫܐ . ܘܡܬܥܒܕܝܢ ܒܪܐܝܬ ܥܠ ܐܝܠܝܢ ܡܠܘܚܝܢܘܬܐ . ܘܦܘܫܐ ܕܦܘܫܐ . ܘܥܠܝܗܐ ܚܫܐ ܠܦܫܛܐ ܕܒܪܐ .

٢ . ܡܩܒܠܢܘܬܐ ܕܛܥܡܐ ܘܡܪܚܬܐ (Chemoreceptors) :

ܐܝܬ ܒܝܫܡܫܐ ܥܒܝܕܐ ܥܠ ܗܕܐ ܦܘܫܩܐ ܘܗܕܐ ܦܘܫܩܐ ܘܦܘܫܐ ܕܦܘܫܐ ܘܡܘܠܟܐ ܕܐܝܠܝܢ ܕܪܫܡܬܐ .

٣ . ܡܩܒܠܢܘܬܐ ܕܫܘܝܘܬܐ (Balance Receptors) :

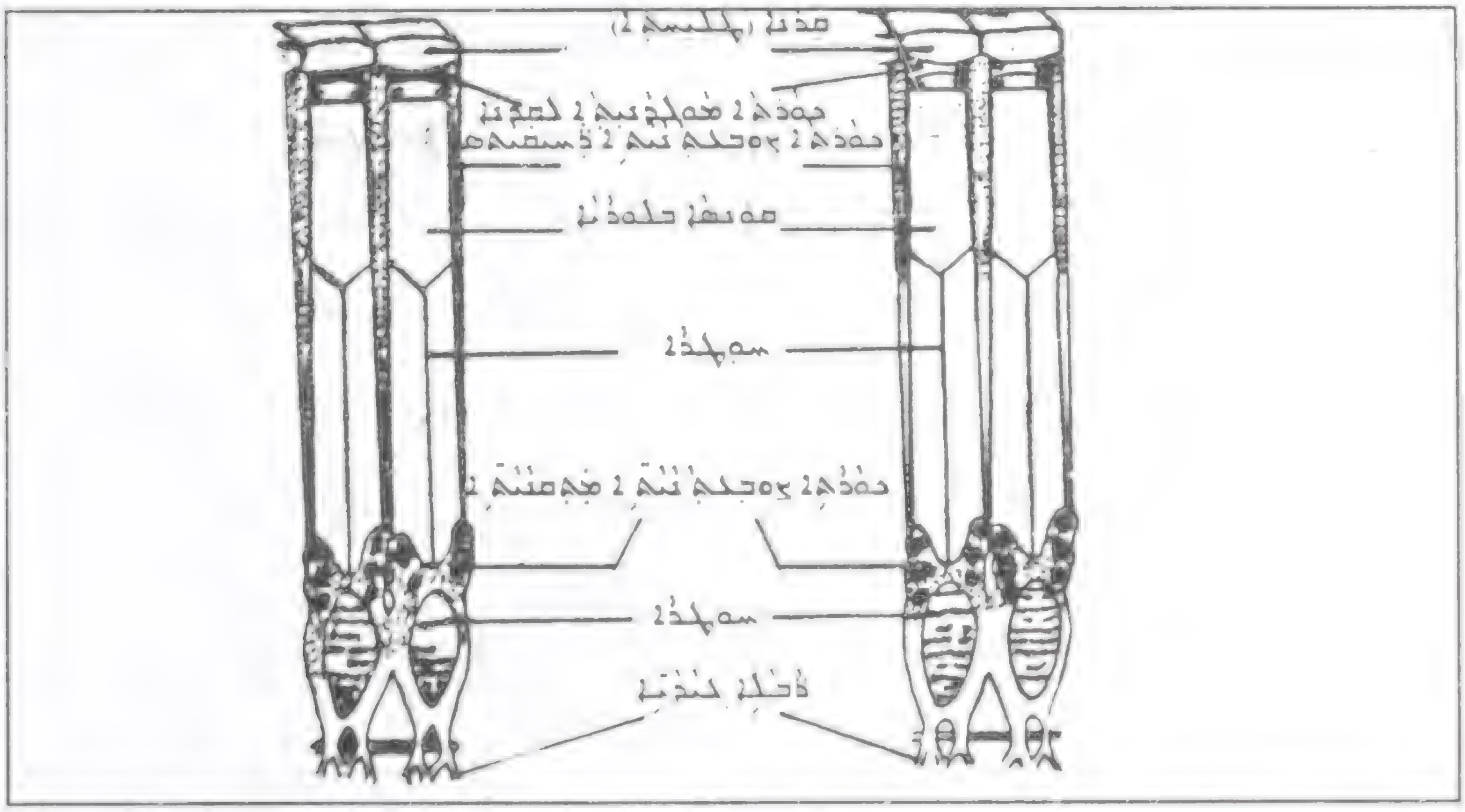
ܐܝܬܠܗ ܦܪ̈ܝܫܐ ܢܘܡܐ ܚܕ ܘܚܕܐ ܡܢ ܐܝܠܝܢ ܗܘܡܐ . ܢܦܠ ܥܠ ܚܕ ܡܢܗܘܢ ܒܦܘܫܐ ܡܬܒܥܝܢܐ . ܠܚܕ ܡܢ ܗܕܐ ܦܘܫܩܐ . ܘܡܕܥܐ ܠܗ ܒܝܬܐ ܕܡܫܠܡܘܬܐ (Statocyst) . ܦܬܐ ܦܠܓܘܬܐ ܐܘ ܒܘܫܬܐ . ܐܝܟ ܕܥܠܝܬܐ ܕܫܘܚܬܐ . ܐܘ ܦܪ̈ܝܫܐ ܠܐ ܢܡܘܣܐ . ܘܬܪܬܐ ܚܕܐ ܒܘܫܬܐ ܐܣܪܝܬܐ ܘܡܬܚܪܝܬܐ ܕܢܘܦܘܬܐ ܐܪܥܝܬܐ ܥܠ ܐܝܠܝܢ ܦܪܕܬܐ ܕܡܠܝܬܐ . ܡܚܬܐ ܚܬܐ ܡܬܘܪܓܬܐ ܠܕܘܟܝܬܐ ܒܫܘܠܡܘܬܐ ܕܚܕܐ . ܘܪܠܝܐ ܚܕܐ ܒܡܫܘ ܠܐ ܦܢܝܬܐ . ܘܥܡܠ ܗܢܐ ܗܪܓܐ .

٤ . ܡܩܒܠܢܘܬܐ ܕܢܘܗܪܐ (Photoreceptors) :

ܐܝܬܠܗ ܚܕܐ ܗܕܐ ܥܝܢܐ ܡܪܟܒܢܝܬܐ . ܢܦܠ ܒܡܫܘܬܦܘܬܐ ܕܪܬܐ ܒܗ ܗܕܐ ܦܘܫܩܐ ܘܢܚܝܪܐ . ܘܗܘܐ ܥܠ ܥܝܢܐ ܦܠܝܓܬܐ ܥܠ ܚܕ ܚܕܐ ܠܗܘܡܪܕܢܐ ܕܕܢܐ ܡܬܦܪܫܢܐ .

ܡܬܘܪܓܬܐ ܠܗ ܥܝܢܐ ܡܢ ٢٥٠٠ ܚܕܝܘܬܐ ܚܘܕܢܝܬܐ . ܦܬܐ ܡܢܐ ܡܪܟܒܐ ܥܝܢܘܢܝܬܐ (Ommatidia) . ܫܪܟܐ ܒܠ ܥܝܢܘܢܝܬܐ ܥܠ ܚܕ ܡܘܫܐ ܒܪܟܐ ܡܥܠܝܐ ܦܬܐ ܠܗ ܡܪܟܐ ܡܪܟܐ (Cornea) . ܒܡܠܐ ܡܢ ܐܠܘܡܘܬܐ

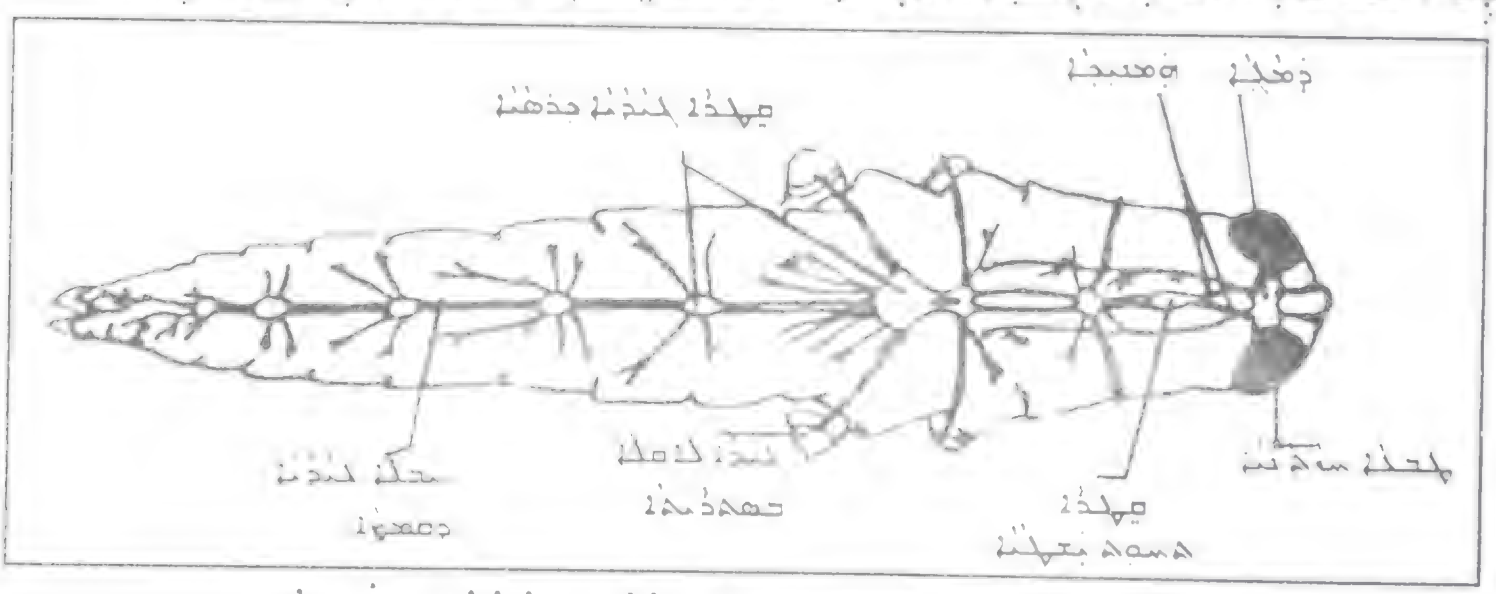
ܒܪܡܐ ܕܚܙܘܐ . ܪ̈ܦܠܘ ܐܪܐܝ ܒܘ̈ܪܐ ܕܠܒܢܬܐ ܡܢ ܒܘ̈ܪܐ ܕܦܪܐ ܕܠܠܒܐ ܢܦܠܝ ܐܣܘܦܘ . ܘܠܠܒ̈ܢܬܐ ܐܣܛܢ̈ܐ ܡܢܝܗܘܢ . ܐܝܟ ܢܪܟܒ ܒܘ̈ܪܐ ܡܘܢܥܬܐ (Cone Cells) . ܡܢܝܢ ܒܪܦܬܐ ܕܡܘܢܥܐ ܒܠܘܕ̈ܢܐ . ܦܠܝܚ ܒܠ ܡܢ ܡܕܢܐ ܘܡܘܢܥܐ ܒܠܘܕ̈ܢܐ ܐܝܟ ܛܠܒܢܬܐ . ܒܕܒܝܬܐ ܢܠܘ ܡܘܢܥܐ ܒܒܘ̈ܪܐ ܚܢܝܢ ܥܠ ܦܪܘܛܘܢܝܬܐ ܙܘܒܠܢܬܐ ܠܒܘܡܛܝ ܠܘܢܐ . ܘܡܢܝܢ ܡܘܢܥܐ ܡܢ ܠܢܬܐ ܐܣܛܢ̈ܐ ܥܠ ܡܛܡܢܘ ܒܕܒܝܬܐ ܒܒܪܒܪ ܒܘ̈ܪܐ ܕܡܢܝܬܐ . ܘܣܓܝ ܒܘ̈ܪܐ ܦܪܝܫܬܐ ܡܢ ܒܠ ܒܘ̈ܪܐ . ܣܒܝܒܢܬܐ ܥܠ ܙܘܒܠܬܐ ܠܒܘܡܛܐ . ܘܡܛܪܝ ܬܒܝܒܬܐ . ܡܬܩܠܦ ܗܘܡܐ ܡܢܛܪܘܬܐ ܠܬܒܝܒܬܐ ܘܦܝܢ ܡܕ̈ܢܐ ܣܘܛܪܐ (Robdome) . ܘܗܘ ܦܠܝܚ ܐܝܟ ܡܡܒܠܢܐ ܠܢܘܗܪܐ . ܦܠܛܐ ܡܢ ܢܝܢܘܢܝܬܐ ܣܓܝ ܡܛܥܪܬܐ ܡܢ ܗܕܡܐ . ܡܛܠ ܒܣܛܪܐ ܠܢܘܗܪܐ ܣܘܟܠܐ . ܘܡܢܗ ܡܛܝܣ ܠܢܘܗܪܐ ܣܘܟ̈ܠܢܐ ܠܡܘܚܐ . ܦܢܝܢ ܦܪܝܫܬܐ ܒܠ ܢܝܢܘܢܝܬܐ ܡܢ ܢܝܢܘܢܝܬܐ ܒܬܒܝܬܐ ܐܠܗ . ܒܡܣܟܢܘܬܐ ܕܒܘ̈ܪܐ ܙܘܒܠܢܬܐ . ܦܢܝܢ ܢܝܢܐ ܡܕ̈ܢܐ ܒܘ̈ܪܐ ܠܒܘܡܛܢ̈ܝܬܐ (Iris Cells) . (ܨܘܪܬܐ ٦ ـ ١٣) .



ܨܘܪܬܐ (٦ ـ ١٣) ܡܢܘܪܬܐ ܠܡܘܚܐ ܕܢܝܢܘܢܝܬܐ
ܠܗ ܥܢܝܢܐ ܕܗܕܡ̈ܐ ܢܣܡܐ .

٤ ـ ٨ ـ ٣ ـ ܪ̈ܓܫܐ :

ܡܛܪܐ ܐܘܪܓܢܐ ܥܨܒܢܝܐ ܠܗ ܡܫܘܝܐ ܒܪܡܫܐ ܐܘ ܡܚܝܠܬܐ ܥܨܒܢܝܐ ܟܠ ܢܦܫܬܐ (   ) . ܘܗܘ ܟܪܐ ܡܢ ܚܘܫܒܐ ܕܡܘܚܐ ܘܒܝܬ ܡܢ ܡܚܝܠܬܐ ܡܬܘܡܬܐ ܒܪܡܫܐ ܬܪܘܬܐ ܘܕܝܢܝܐ ܘܕܠܝܠܝܐ ܘܐܡܪܝܢ ܒܗ ܡܘܚܐ . ܡܬܝܬܝܢ ܠܟܠ ܡܢ ܥܝܢܐ ܥܝܢܐ (deuto tyito cerebrum . ܘܗܕܐ ܠܥܘܦܐ . ܘܥܒܕܐ ܕܡܢܘܬܐ ܐܣܝܪܬܐ ܕܥܝܢܐ . ܘܐܦ ܕܡܠܝܐ ܒܡܫܚܘܬܐ ܕܗܕܐ ܡܘܚܐ . ܗܕܐ ܚܕܐ ܢܝܬܐ ܒܡܚܝܠܬܐ ܐܣܘܛ ܡܬܝܬܐ ܐܨܘܪܬܐ ٦ ـ ١٤) . ܗܝ ܕܡܬܦܪܩܐ ܠܗ ܡܢ ܡܬܚܕܢܘܬܐ ܕܬܠܬܐ ܘܡܠܝܐ ܡܢ ܡܚܝܠܬܐ ܡܬܘܡܝ ܠܦܛܐ ܥܠܝܐ (Maxilla) ܘܦܛܐ ܐܚܪܝܐ (Mentum) ܘܣܦܬܐ (Labium) ܕܠܬܚܬ . ܘܡܢ ܐܦ ܡܚܝܠܬܐ ܡܬܗܘ ܚܕܬܐ ܥܨܒܐ ܘܡܠܝܐ ܒܚܝܠܐ ܕܪܫܡܐ ܠܥܘܠܡܐ ܕܦܘܡܐ . ܘܝܘܬܐ ܒܣܕܪܐ ܫܠܝܚܬܐ ܡܬܦܪܫܐ ܡܚܝܠܬܐ ܥܨܒܝܐ ܐܚܪܝܐ . ܘܟܠ ܫܠܝܚܬܐ ܡܢ ܗܠܝܢ ܫܠܝܚܬܐ ܕܙܘܓܐ . ܐܝܬ ܚܕ ܡܚܝܠܬܐ ܥܨܒܝܐ ܘܡܠܝܐ . ܡܬܘܕܝ ܠܐܝܠܐ ܘܠܥܘܠܡܐ ܘܠܘܬ ܕܐܝܬ ܠܗ ܗܝ ܫܠܝܚܬܐ ܕܬܚܬ . ܐܦ ܗܟܢܐ ܐܝܬ ܚܡܫܐ ܘܡܠܝܐ ܡܢ ܡܚܝܠܬܐ ܥܨܒܝܐ ܘܡܠܝܐ . ܠܗ ܦܢܝܬܐ ܕܪܫܡܐ ܠܪܘܚܬܐ ܕܥܕܢܐ . ܡܬܘܕܝ ܠܦܘܪܐ ܕܦܘܡܐ ܒܡܬܚܐ ܕܬܚܬ . ܘܦܪܫܠܗ ܣܘܓܐ ܚܕ ܐܘܪܓܢܐ ܥܨܒܝܐ ܢܝܕܢܝܐ (ܣܝܡܦܬܝܩܝ) . ܐܡܝܢܐ ܒܟܠ ܡܢ ܪܡܫܐ ܘܡܫܘܚܐ ܠܡܪܟܒܐ ܕܡܢܝܢܐ ܡܢ ܒܘܣܡܐ ܦܪܝܫܐ ܘܠܒܐ ܘܡܫܘܚܐ ܐܚܪܝܐ ܡܢ ܒܘܣܡܐ ܦܪܝܫܐ . ܗܘ ܕܢܦܩ ܠܒܝܬܐ ܡܢ ܡܚܝܠܬܐ ܥܨܒܝܐ ܕܪܫܡܐ ܐܚܪܝܐ . ܘܐܘܪܓܢܐ ܢܘܟܪܝܐ . ܐܦ ܗܟܢܐ ܐܝܬ ܚܕ ܒܘܣܡܐ ܡܢ ܥܨܒܐ . ܦܪܫ ܐܣܘܛ ܠܘܬܐ ܕܦܘܡܐ . ܒܐܨܘܪܬܐ ܕܩܛܠܐ ܕܥܨܒܐ .



ܐܨܘܪܬܐ (٦ ـ ١٤) ܐܘܪܓܢܐ ܥܨܒܝܐ ܕܚܪܫܐ

٤ — ٨ . ٤ — ܗܘܡܐ ܕܪܒܬܐ :

ܦܫܐ ܝܢܐ ܡܫܬܘܕܥܠܐ ܗܘܡܐ ܕܪܒܬܐ ܠܗ ܡܢܝܢܐ ܠܡܚܠܬܐ ܕܡܚܘܪܢܐ ܡܢ ܡܣܒܘܪܐ ܗܘ ܕܫܢܐ ܠܗܘ ܚܢܕܐܝܬ ܡܬܘܕܥܐ ܝܢܐ ܡܢ :

ܐ. ܡܬܚܘܫܢܬܐ ܡܫܠܚܢܝܬܐ ܡܣܬܒܪ ܒܠܘܥܩܐ . ܘܦܪܩܝ ܥܠ ܦܢܝܬܐ ܡܥܠܩܢܬܐ ܕܠܘܥܡܐ . ܘܦܪܥܬܢܝܬ ܥܠ ܗܕܝ ܠܥܘܦܐ . ܘܗܘܡܐ ܕܠܘܥܩܐ ܕܐܝܬ ܠܗ ܦܘܡܐ ܘܢܣܘܦܐ ܕܒܪܩܐ . ܘܫܠܕܐ ܐܫܪܐ ܡܢ ܐܘܠܐ .

ܒ. ܡܣܒܠܢܝܬܐ ܕܡܪܫܬܐ . ܢܦܠܝ ܠܗ ܗܘܡܐ ܕܦܘܡܐ ܚܢܕܐܝܬ .

ܓ. ܗܘܡܐ ܕܫܠܡܐ . ܢܦܠܝ ܠܗ ܗܘܡܐ ܕܦܘܡܐ ܚܢܕܐܝܬ .

ܕ. ܚܒܝܐ ܦܣܝܠܬܐ . ܘܡܢܝܢ ܝܠܗ ܗܠܗ . ܗܘܝ ܕܠܘܥܡܢܝܬܐ ܠܚܘܪܐ ܘܫܠܐ . ܐܝܢܐ ܠܐ ܡܚܝ ܕܪܕܦ ܠܚܘܪܢܬܐ ܕܠܘܥܡܐ .

ܗ. ܚܒܝܐ ܡܪܒܢܝܬܐ . ܘܫܠܚ ܗܕܝ . ܢܦܠܝ ܥܠ ܗܕܝ ܠܢܚܫܐ ܕܪܥܐ ܡܢ ܫܠܠ . ܡܪܡܝ ܠܚܕ ܕܪܓܐ ܠܒܘܪܐ . ܠܫܢܝܬܐ ܠܗ ܡܠܦܢܬܐ ܡܢ ܠܢܚܫܐ ܕܪܘܒܐ ܘܢܒܬܐ .

ܘ. ܗܘܡܐ ܕܥܡܠܐ . ܘܡܬܘܕܥܐ ܝܢܐ ܡܢ ܗܕܝ ܫܠܒܐ ܕܫܒܠܬܐ . ܢܦܠܝ ܥܠ ܗܕܝ ܠܢܚܫܐ ܕܫܠܡܬܐ ܒܪܫܬܐ ܡܒܡܫܬܐ . ܡܟܢܝ ܠܟܒܪܐ ܕܡܠܐ ܡܥܠܩܐ ܒܫܢܐ ܒܗܘܐ ܠܫܕܐ ܦܢܬܐ ܐܫܠܘܢܬܐ . ܢܦܠܐ ܗܣܘܪܝܣ . ܘܡܫܢܐ ܒܒܪܘ ܒܪܒܠܐ ܠܪܒܐ ܕܠܒܐ . ܘܡܢܝܐ ܡܢܝܢܐ ܠܦܠܫܬܐ ܕܡܠܐ ܕܠܒܢܐ . ܡܢ ܦܠܫܐ ܕܡܫܬܒܫܘܬܐ ܕܫܒ ܗܒܪܐ ܡܢ ܒܘܒܐ ܚܫܒܝܢܐ . ܢܦܠܐ ܥܠ ܐܪܒܘܬܐ ܕܒܫܢܐ ܡܢܟܢܐ . ܕܐܡܠܐ ܒܗܬܪܢܐ . ܥܡ ܥܪܡܐ ܕܠܘܠܦܐ ܡܪܡܢܐ .

٤ . ٩ — ܐܘܕܢܬܐ ܠܒܘܫܬܐ ܠܗ ܦܪܕܬܢܝܬܐ :

ܡܥܡ ܐܘܕܢܬܐ ܠܒܘܫܬܐ ܠܗ ܫܘܦܬܐ ܦܪܕܬܢܝܬܐ ܡܢ ܐܝܟ ܐܘܕܢܬܐ ܠܒܘܫܬܐ ܒܥ ܡܫܒܪܐ . ܘܡܕܝ ܡܢܘܬܗ ܪܒܐ ܠܗ ܕܘܪܐ ܒܘܠܒܐ ܡܢ ܐܒܘܒܐ ܠܒܘܫܐ . ܘܗܘ ܝܠܗ ܪܘܒܒܐ ܫܠܝܠܬܐ . ܢܦܠ ܠܗ ܗܘܡܐ ܫܘܪܐ ܡܢ ܒܘܠܐ . ܡܬܘܕܥܐ ܠܗ ܐܝܬ ܐܒܘܒܐ ܡܢ ܡܫܬܪܢܘܬܐ ܠܗܫܬܐ . ܕܪܕܡܬܐ ܡܘܕܡܫܬܐ ܬܪܬܐ . ܕܡܕܒܪܐ ܠܗ ܒܐܢܛܝܒܝܘܛܝܩܐ ܐܘܠܝܐ (ܐܡܦܝܣܠܝܢ) . ܪܘܚ ܗܘܡܐ ܠܡܪܡܝܐ ܕܐܒܘܒܐ . ܘܡܬܪܝ ܕܡܬܝܐ . ܐܝܢܐ ܗܘܡܐ ܒܫܡܪܬܐ ܡܬܪܝ ܡܘܫܐ

ܒܡܘܚ̈ܐ (ܡܢܘܚ̈ܬܐ) . ܘܡܬܩܪܝܢ ܚܠܠܘ̈ܬܐ ܡܠܝܐ ܒܚܝܠܐ ܒܥܡܘܕܡܘܚܐ ܕܐܒܘܒܐ ، ܗܢܐ ܕܡܬܩܘܡܘ ܐܝܟ ܚܠܠܘ̈ܬܐ ܕܡܘܚ̈ܐ ܐܘ ܒܪ̈ܘܩܘܬܐ (Ventricles) ، ܘܒܐܝܢܘܗܝ ܒܡܘܬܐ ܒܡܘܚܐ . ܘܡܬܩܪܝܐ ܐܝܟ ܕܡܘܚܐ ܬܠܬ ܠܡܢܘܬܐ ܕܦܪܝܫܘܬܗ ܘܐܬܝܕܥܘ ܡܢ ܡܢܘܬܐ ܕܒܐܬܪܐ ܗܢܐ (ܐܣܟܡܐ ٦ ـ ١٥) :

. ܡܘܚܐ ܩܕܡܝܐ Fore brain

. ܡܘܚܐ ܡܨܥܝܐ Mid brain

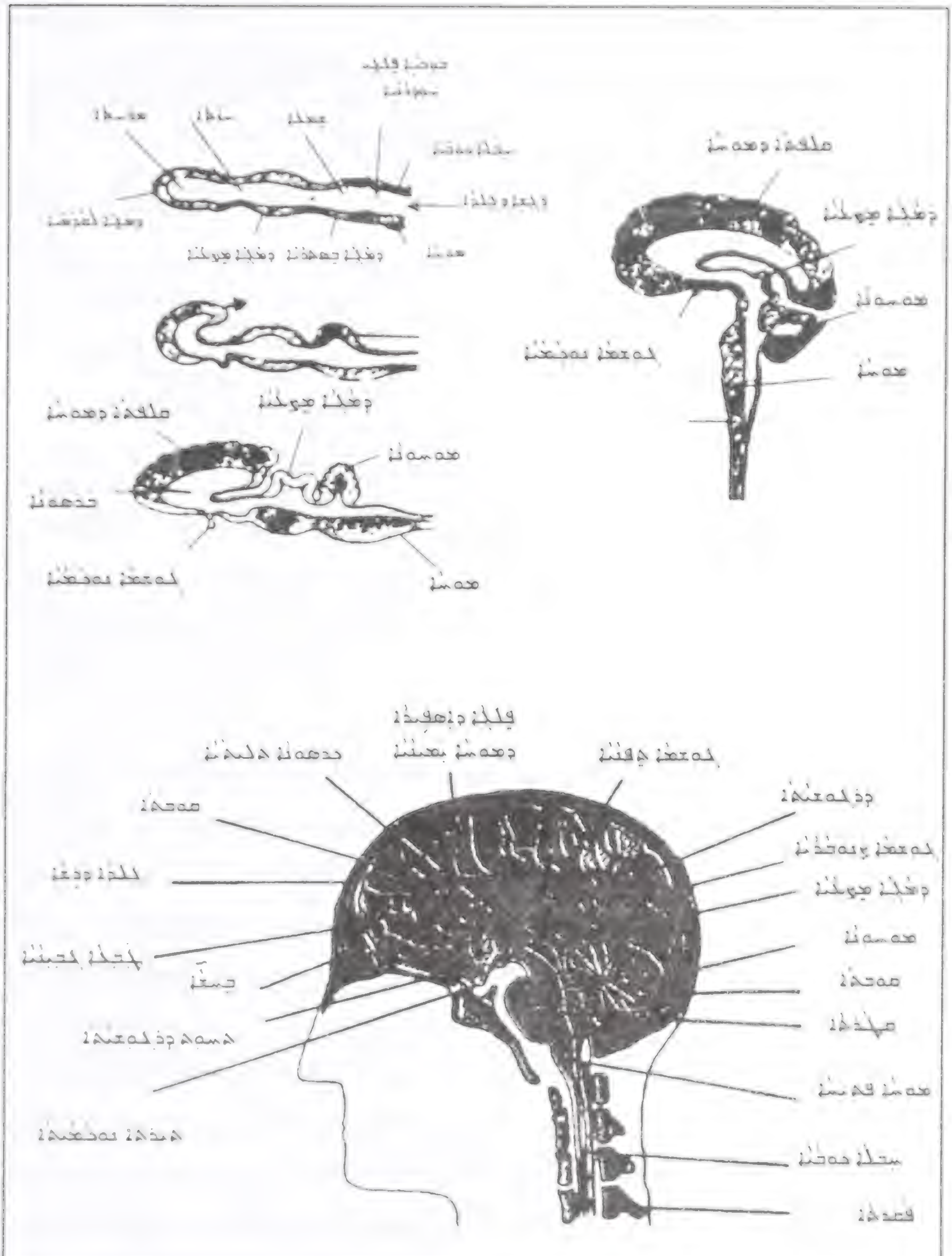
. ܡܘܚܐ ܒܣܬܪܝܐ Hind brain

٤ ـ ٩ ـ ١ ـ ܡܘܚܐ ܩܕܡܝܐ (Fore Brain) :

ܡܬܦܠܓ ܗܘ ܡܘܚܐ ܩܕܡܝܐ ܡܢ ܬܪܝܢ ܦܠܓܘܬܐ ܕܐܝܬ ܠܗ ܣܘܦܐ ܕܡܘܚܐ (Telencephalon) ، ܘܡܘܚܐ ܒܝܢܝܐ (Diencephalon) . ܘܡܬܩܪܐ ܣܘܦܐ ܕܡܘܚܐ ܗܢܐ ܦܠܓܐ ܕܐܣܦܝܪܐ ܕܡܘܚܐ . ܘܡܢܗܘܢ ܟܠ ܚܕ ܙܘܓܐ ܡܢ ܦܠܓܐ ܡܬܚܒܪܝܢ . ܘܐܝܬ ܠܗ ܡܨܝܥܘܬܐ ܠܦܠܓܐ ܕܡܚܫܒܬܐ .

ܟܕ ܐܘ ܣܘܦܐ ܡܢ ܡܘܚܐ ܠܘ ܦܠܓܐ ܘܡܬܚܒܪܝܢ ܒܐܣܦܝܪܐ ܚܕܐ . ܘܗܘܝܐ ܡܬܩܪܐ ܗܢܐ ܦܠܓܐ ܕܐܣܦܝܪܐ ܕܡܘܚܐ ܡܘܬܒܗ ، ܕܐܝܬ ܣܘܦܐ ܐܚܪܝܐ ܕܡܘܚܐ .

ܡܢܗܘܢ ܗܢܐ ܦܠܓܐ ܕܐܣܦܝܪܐ ܕܡܘܚܐ ܡܨܝܥܘܬܐ ܕܗܓܝܢܘܬܐ ܘܡܫܡܠܝܘܬܐ ܕܪܓܫܬܐ ܘܙܘܥܬܐ . ܘܡܬܕܒܪ ܦܠܓܐ ܐܦܢܐ ܒܚܠܝܦܘܬܐ ܥܠ ܒܘܪܐ ܕܦܪܘܩܘܬܐ . ܘܐܝܬ ܚܕ ܒܘܢܝܐ ܡܢ ܥܝܒܠܐ ܡܬܚܙܝܐ ܒܐܝܟܢܘܬܐ ܕܡܬܚܒܪܝܢ ، ܐܝܟ ܗܢܐ ܦܠܓܐ ܕܐܣܦܝܪܐ ܕܡܘܚܐ . ܘܡܬܩܪܐ ܗܘ ܒܫܡܐ ܦܩܬܐ (Corpus Callosum) . ܢܦܠ ܬܚܬ ܣܘܦܐ ܕܡܘܚܐ . ܦܘܫܐ ܦܠܓܐ ܡܢ ܡܘܚܐ ܩܕܡܝܐ : ܗܘ ܕܡܬܩܪܐ ܡܘܚܐ ܒܝܢܝܐ ، ܘܗܘ ܐܝܬ ܚܕ ܦܘܫܐ ܦܪܝܢܐ ܠܐ ܙܘܓܐ . ܡܢܗ ܟܠ ܕܪܓܫܬܐ ܘܡܚܫܒܬܐ ܕܪܓܫܬܐ . ܘܐܝܬ ܐܝܬܝܗ ܡܨܝܥܘܬܐ ܡܢܬܪܐ . ܡܬܚܙܝܢ ܟܠ ܕܐ ܡܢ ܠܥܒܘܕܘܬܐ ܠܐ ܨܒܝܢܝܬܐ ، ܘܡܫܡܠܝܢ ܒܐܝܟܢܘܬܐ ܕܗܝܕܘܬܐ ܘܢܘܡܐ ، ܘܡܢܠܐ ܕܟܪܘܟܬܐ ܘܐܝܟܢܘܬܐ ܚܘܫܒܢܝܬܐ . ܢܦܠ ܡܢ ܦܠܓܐ ܚܕܐ ܕܡܘܚܐ ܒܝܢܝܐ ، ܠܘܥܐ ܨܢܘܒܪܐ ، ܘܡܢ ܦܠܓܐ ܒܪܝܐ ܦܬܐ ܢܘܒܪܬܐ . ܘܡܬܩܪܝܐ ܗܘ ܠܘܥܐ ܨܢܘܒܪܐ ، ܐܝܟ ܦܠܓܐ ܦܠܝܛܬܐ ، ܠܐ ܡܬܚܙܝܐ ܚܘܫܒܐ ܚܘܕܪܢܝܐ ܦܘܫܐ ܐܝܟ ܠܡܦܪܝ (Lamphrey) ، ܘܡܬܩܪܝܐ ܒܥܘܦܝܬܐ . ܦܬܝܠܘ ܚܘܝܬܐ ܠܐ ܡܬܦܫܢܝܬܐ ܕܢܘܒܪܐ ، ܐܝܟܢܐ ܢܦܠ ܚܘܦܐ ܗܢܐ ܦܠܓܐ ܕܐܣܦܝܪܐ ܕܡܘܚܐ ، ܠܐ ܡܬܚܒܪܐ ܘܡܬܚܠܦܢܘܬܐ ، ܘܠܐ ܢܦܫ ܡܠܬܐ ܚܕܐ ܦܘܬܐ ܡܬܝܕܥܬܐ .



ܨܘܪܬܐ (٦ ـ ١٥) ܐ ـ ܫܘܚܠܦܐ ܕܡܘܚܐ ܕܚܠܒܢ̈ܝܬܐ

(ܡܬܚܙܝܢܐ ܡܢ ܣܛܪ̈ܐ) .

ܒ ـ ܡܬܚܙܝܢܐ ܠܗ ܪܫܐ ܡܢܘܬܐ ܠܦܘܡܐ ܕܡܘܚܐ ܕܒܪܢܫܐ .

٤ _ ٩ _ ٢ ___ ܡܘܚܐ ܡܨܥܝܐ (Mild Brain) :

ܗܢܐ ܐܝܠܗ ܦܘܪܫܐ ܡܢ ܡܘܚܐ ܥܠ ܗܕܐ ܓܒܓܒܐ ܣܘܟܠܝܬܐ. ܐܝܟ ܕܦܠܓ ܓܒܓܒܐ ܚܘܪܐ ܡܢܗ. ܘܐܝܬ ܒܗ ܡܫܪܘܝܐ ܠܣܘܟܐ ܐܘ ܚܙܝܐ ܒܬܪܘܬܐ. ܚܕܬܐ ܡܢ ܚܠܝܢܘܬܐ. ܘܡܫܠܚ ܐܘܢ ܩܒܠܐ ܐܢܫܝܐ ܐܡܘܢܐ ܡܢ ܗܕܡܐ ܟܢܝܐ. ܐܝܟ ܐܘ ܚܠܝܢܘܬܐ ܩܒܠܐ ܐܢܫܝܐ ܣܘܟܠܝܐ. ܡܓܒܐ ܠܡܫܪܘܝܐ ܕܣܘܟܠܐ ܕܐܝܬ ܒܫܒܥܐ ܕܗܕܐ ܦܠܓܐ ܕܐܣܦܪܐ ܕܡܘܚܐ. ܘܡܫܬܚܠܦ ܓܒܓܒܐ ܣܘܟܠܝܐ ܐܠܝܬܐ. ܡܫܪܪܐ ܕܡܫܘܚܬܐ ܠܪܫܐ ܐܢܫܝܐ ܣܘܟܠܝܐ

٤ _ ٩ _ ٣ _ ܡܘܚܐ ܒܣܬܪܝܐ (Hind Brian) :

ܡܬܦܪܫܐ ܝܠܗ ܡܢ ܗܕܐ ܦܘܪܫܐ ܓܡܝܪܐ. ܚܕ ܡܢܗ ܠܩܕܡܝܐ. ܡܕܝܢܐ ܡܘܚܐ ܚܕܬܝܐ (alon Meteneeph) ܘܐܚܪܝܐ ܒܣܬܪܝܐ ܡܕܝܢܐ ܡܘܚܐ ܒܘܨܝܐ (Myeleneephalon) ܐܘ ܡܘܚܐ ܡܬܚܫܐ (Medulla obleugata) ܐܘܪܟܬܐ (٦ _ ١٥).

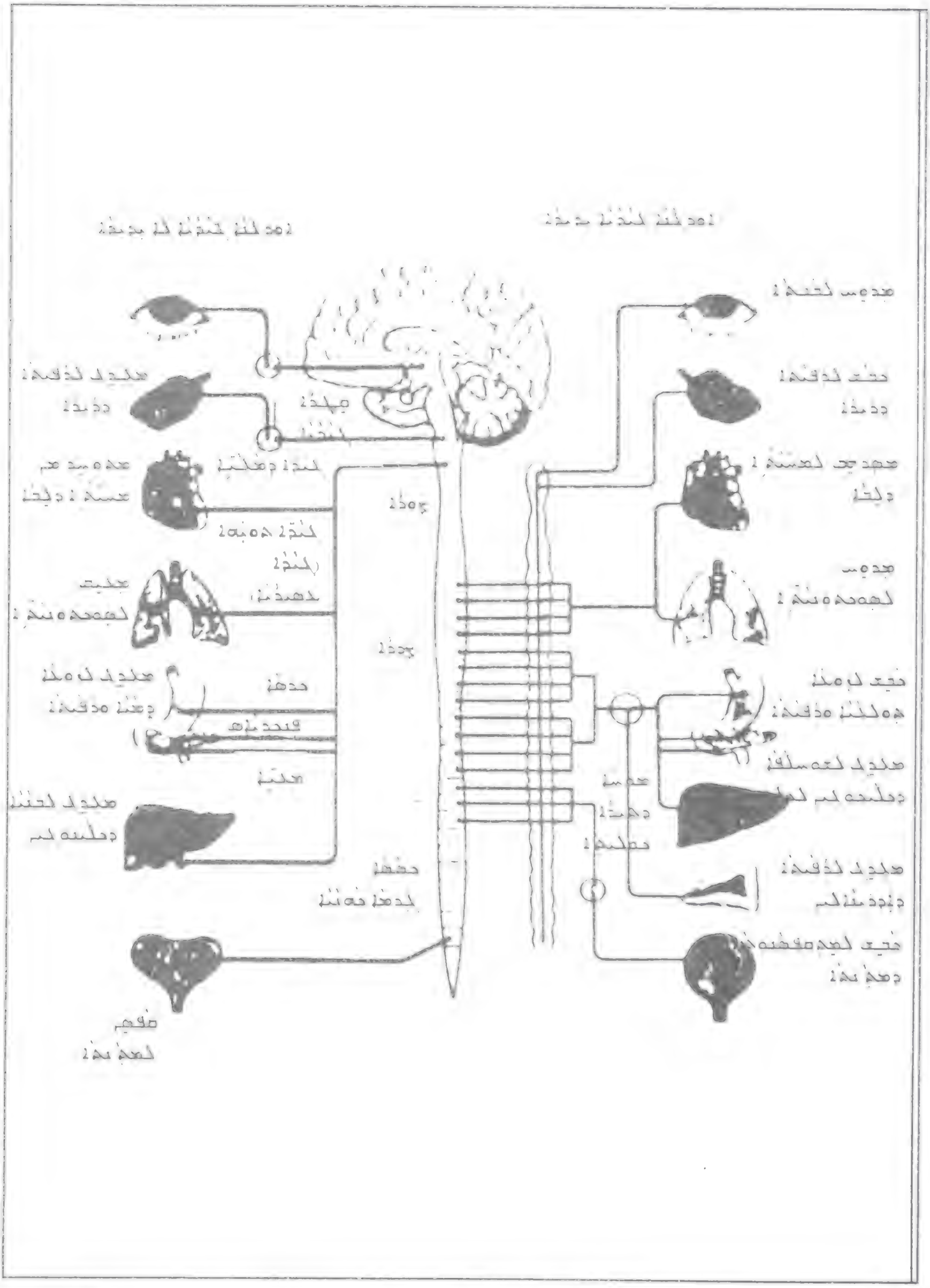
ܦܪܝܫܐ ܝܠܗ ܡܘܚܐ ܚܕܬܝܐ ܡܢ ܓܒܝܐ ܚܘܪܐ ܒܐܝܬܘܬܐ ܕܡܘܚܢܐ (Cerebellum) . ܘܗܘ ܝܠܗ ܚܕ ܓܒܓܒܐ ܓܒܘܪܐ ܡܬܘܟܠܢܝܬܐ. ܡܫܬܪܐ ܠܫܦܝܪܘܬܐ ܒܡܕܪܟܢܘܬܐ. ܐܘ ܠܘܚܡܐ ܒܐܝܬܘܬܐ ܕܡܘܚܐ ܡܫܠܡܐ. ܡܫܡܠܐ ܠܫܦܝܪܘܬܐ ܕܥܘܒܕܐ ܕܠܘܚܡܐ ܘܡܬܠܘܐ. ܐܦ ܦܝܫ ܚܙܝܐ ܒܘܟܪܐ ܥܠܝܐ ܒܓܒܓܒܐ ܒܪܝܐ ܠܡܘܚܐ ܚܕܬܝܐ ܝܠܗ ܡܫܬܪܐ (Pons) . ܓܒܪܐ ܐܘ ܩܒܠܐ ܐܢܫܝܐ ܒܝܢ ܡܘܚܐ ܘܚܒܠܐ ܒܘܨܝܐ. ܡܢ ܚܕ ܓܒܐ ܠܓܒܐ ܐܚܪܢܐ. ܘܡܢ ܥܠܬܐ ܕܐܝܬ ܒܪܬܐ. ܡܫܠܡ ܓܒܐ ܡܚܝܢܐ ܡܢ ܡܘܚܐ. ܠܓܒܝܬܘܬܐ ܕܓܒܐ ܡܫܠܡܐ ܡܢ ܠܘܚܡܐ ܘܡܘܦܩܐ.

ܗܢܐ ܡܘܚܐ ܡܬܚܫܐ ܥܠ ܡܫܪܘܝܐ ܕܥܠܝܬܘܬܐ ܐܢܫܝܬܐ. ܡܕܪܟ ܐܚܝܘܬܐ ܒܡܫܚܬܐ ܕܠܒܐ. ܘܡܫܘܚܬܐ ܡܠܝܐ ܘܦܩܕܘܬܐ. ܘܡܫܪܪ ܐܝܟ ܦܘܪܫܐ ܠܒܬܪܝܐ. ܕܡܘܚܐ ܒܣܬܪܝܐ ܒܘܨܝܐ. ܘܦܠܓܐ ܐܢܫܐ ܡܘܟܝܢܐ ܘܡܢܗ ܗܪܟܐ ܘܠܐ ܡܢ ܡܘܚܐ. ܘܐܚܘܪܢܐ ܡܢ ܡܘܚܐ ܡܬܚܫܐ. ܚܕܘܪ ܡܢ ܒܝܬ ܘܡܬܡܛܝܐ. ܐܝܟ ܕܡܢܗ ܝܠܗ ܒܗܪܐ ܘܠܐ ܟܠܗܘܢ ܐܦ ܢܘܟܠ ܚܒܠܐ ܒܘܨܝܐ ܐܢܫܐ ܦܘܪܫܐ ܐܘ ܚܠܝܢܘܬܐ (٣١) ܘܠܐ ܓܒܪܐ ܠܓܘܝܐ ܘܡܢܐ. ܗܢܐ ܐܢܫܐ ܒܘܨܝܐ ܠܪܓܠܐ ܕܐܢܫܐ. ܐܝܟ ܡܢ

ܠܓܘܫܡܐ ܘܥܠ ܕܒܠܐ ܘܡܘܚܐ ، ܦܠܓܝܢ ܡܢ ܚܝܠܐ ܓܘܫܡܢܝܐ ܙܥܘܪ ܡܫܬܡܫܢܘܬܐ
ܠܗ ܦܢܝܬܐ ܕܓܘܫܡܐ ، ܡܢ ܒܘܡܩܕܢܬܐ ܘܡܒܕܢܬܐ . ܡܬܚܙܝܢ ܠܓܘܫܡܐ
ܕܗܘܕܬܐ ܕܕܒܠܐ ܕܡܚܐ ، ܠܟܪ ܚܝܠܐ ܓܘܫܡܢܝܐ ، ܠܗ ܡܬܚܙܐ ܓܘܫܡܢܝܐ .

٤ ـ ٩ ـ ٤ ـ ܐܘܪܓܢܐ ܠܢܝܪܐ ܡܢ ܝܠܢܝܐ :

ܦܡܕܥܢܝܬܐ ܐܝܬܠܗܘ . ܐܘܪܓܢܐ ܠܢܝܪܐ ܡܢ ܝܠܢܝܐ (Autonomic Nervous System) ، ܠܟܪ ܓܘܫܡܢܝܐ ، ܦܕܝܫܐ ܡܢ ܐܘܪܓܢܐ ܠܢܝܪܐ ܡܬܚܕܘܢܝܐ (ܕܡܚܝܐ ܘܚܝܠܐ ܓܘܫܡܢܝܐ) ، ܘܐܘܪܓܢܐ ܠܢܝܪܐ ܣܘܝܕܢܝܐ (ܠܢܝܪܐ ܡܘܩܕܢܝܐ ܘܠܢܝܪܐ ܓܘܫܡܢܝܐ) ، ܡܫܠܛ ܐܗܘ ܐܘܪܓܢܐ ܥܠ ܦܠܚܘ ܠܒܘܕܗܘܬܐ ܠܐ ܨܒܝܢܝܬܐ .
ܘܡܬܗܘܕܥܐ ܠܗ ܡܢ ܕܒܠܐ ܠܢܝܪܐ ܠܐ ܡܕܡܝܐ . ܘܡܢ ܡܬܚܕܘܢܐ ܠܢܝܪܐ ܠܗ ܚܝܠܐ ܓܘܫܡܢܝܐ ܘܕܡܚܝܐ . ܘܡܢ ܚܕܐ ܓܒܠܬܐ ܡܢ ܡܬܚܙܐ ܣܘܝܕܢܐ ܘܚܘܕܪܐ .
ܡܬܚܙܝܢ ܕܒܠܐ ܠܢܝܪܐ ܕܠܒܢܐ ܐܚܪܢܐ ܡܢ ܠܒܒܐ ܕܓܘܫܡܐ . ܘܐܝܟ ܕܠܐ ܫܠܛܝܢ ܠܫܠܝܛܘܬܐ ܨܒܝܢܝܬܐ ܗܢܐ ܡܬܚܕܘܢܐ (ܕܡܚܝܐ ܘܓܘܫܡܢܝܐ) . ܘܡܢ ܦܘܩܕܐ
ܥܠ ܐܝܟ ܕܒܠܐ ܠܢܝܪܐ ܕܠܒܢܐ . ܐܝܟ ܕܠܐ ܡܢ ܡܫܬܠܛܢܘܬܐ ܕܡܫܬܘܕܥܐ ܠܗ
ܠܗܘܢܐ ܕܡܢܐ ܕܡܚܐ ܠܚܘܕܪܐ ܡܘܕܥܐ ܕܠܟܐ . ܡܬܚܙܝܢ ܕܒܠܐ ܘܡܘܚܐ ܡܢ ܝܠܢܝܐ
ܡܢ ܡܬܚܕܘܢܐ ܕܡܫܬܡܫܢܘܬܐ ܘܐܝܟ ܠܗܘܢ ܗܠܝܢ ܐܪܒܥܐ ܦܕܝܫܐ ܡܢ ܓܒܠܬܐ .
ܡܕܡܝܐ ܚܕܝܢ ܕܒܠܐ ܐܝܟ ܕܦܠܓܝܢ ܡܢ ܕܡܚܝܐ . ܘܦܘܡܐ ܒܡܬܚܙܐ ܡܢ ܚܝܠܐ
ܓܘܫܡܢܝܐ . ܡܬܚܙܐ ܐܘܪܓܢܐ ܠܢܝܪܐ ܠܐ ܣܘܝܕܢܐ (Parasympathetic Nervous System) .
ܐܝܢܐ ܐܪܒܥܐ ܗܕܝܢܐ ܚܕܝܢ ܕܒܠܐ ܐܝܟ ܕܦܠܓܝܢ ܡܢ ܦܘܡܐ ܡܢ ܝܠܢܝܐ ܕܚܝܠܐ ܓܘܫܡܢܝܐ . ܘܡܬܚܙܐ ܐܘܪܓܢܐ ܠܢܝܪܐ ܣܘܝܕܢܐ Sympathetic Nnervous System .
ܡܘܦܩ ܥܠ ܦܘܡܐ ܡܢ ܦܘܡܐ ܕܠܗܘܢ . ܐܝܟ ܕܠܐ ܫܠܛܝܢ ܠܫܠܝܛܘܬܐ ܨܒܝܢܝܬܐ .
ܐܝܟ ܠܟܠܐ ܘܡܚܝܐ ، ܒܕܒܠܐ ܘܡܘܚܐ ܡܢ ܗܠܝܢ ܐܪܒܥܐ . ܘܗܘ ܦܕܝܫܐ ܠܗ
ܡܫܘܡܫܐ ܒܡܣܝܒܪܢܘܬܐ ܗܕܝܬܐ . ܕܦܕܝܫܐ ܠܗ ܒܢܝܪܐ ܒܡܫܬܡܫܢܘܬܐ
ܕܡܘܬܠܬܐ . ܐܘ . ܗܘ ܕܒܠܐ ܣܘܝܕܐ ܡܫܡܫܢܐ ܠܦܘܡܐ ܡܚܘܝܢܐ . ܘܚܝܠܐ
ܕܕܒܠܐ ܠܐ ܣܘܝܕܐ ، ܦܠܓ ܗܠܝܢ ܡܫܬܡܫܢܘܬܐ ܡܫܘܚܠܦܬܐ ܠܗܘ ܦܘܡܐ . ܘܡܢ
ܦܘܩܕܐ ، ܚܝܠܐ ܕܕܒܠܐ ܣܘܝܕܐ . ܡܫܬܘܕܥ ܡܢ ܡܫܚܬܐ ܕܠܟܐ . ܐܝܢܐ
ܡܬܚܙܝܢ ܕܒܠܐ ܠܐ ܣܘܝܕܐ ܡܢ ܡܫܚܬܗ ، ܘܡܬܝܕܥܘܬܗ ܒܥܠ ܕܦܩܐ ܠܗ
ܦܠܓܐ ܕܗܘܡܠܐ ܒܢ ܗܠܝܢ ܡܫܬܡܫܢܘܬܐ (ܐܗܡܝܬܐ ٦ ـ ١٦) .



ܨܘܪܬܐ (٦ ـ ١٦) ܬܫܡܫܬܐ ܕܓܝܕ̈ܐ ܥܨܒ̈ܢܝܐ ܡܫܬܠܛ̈ܢܐ (ܡܪ̈ܟܐ)

٤ ـ ١٠ ـ ܡܪܓܫܢܘܬܐ ܟܝܡܝܝܬܐ :

٤ ـ ١٠ ـ ١ ـ ܐܕܫܐ ܕܡܪܓܫܢܘܬܐ :

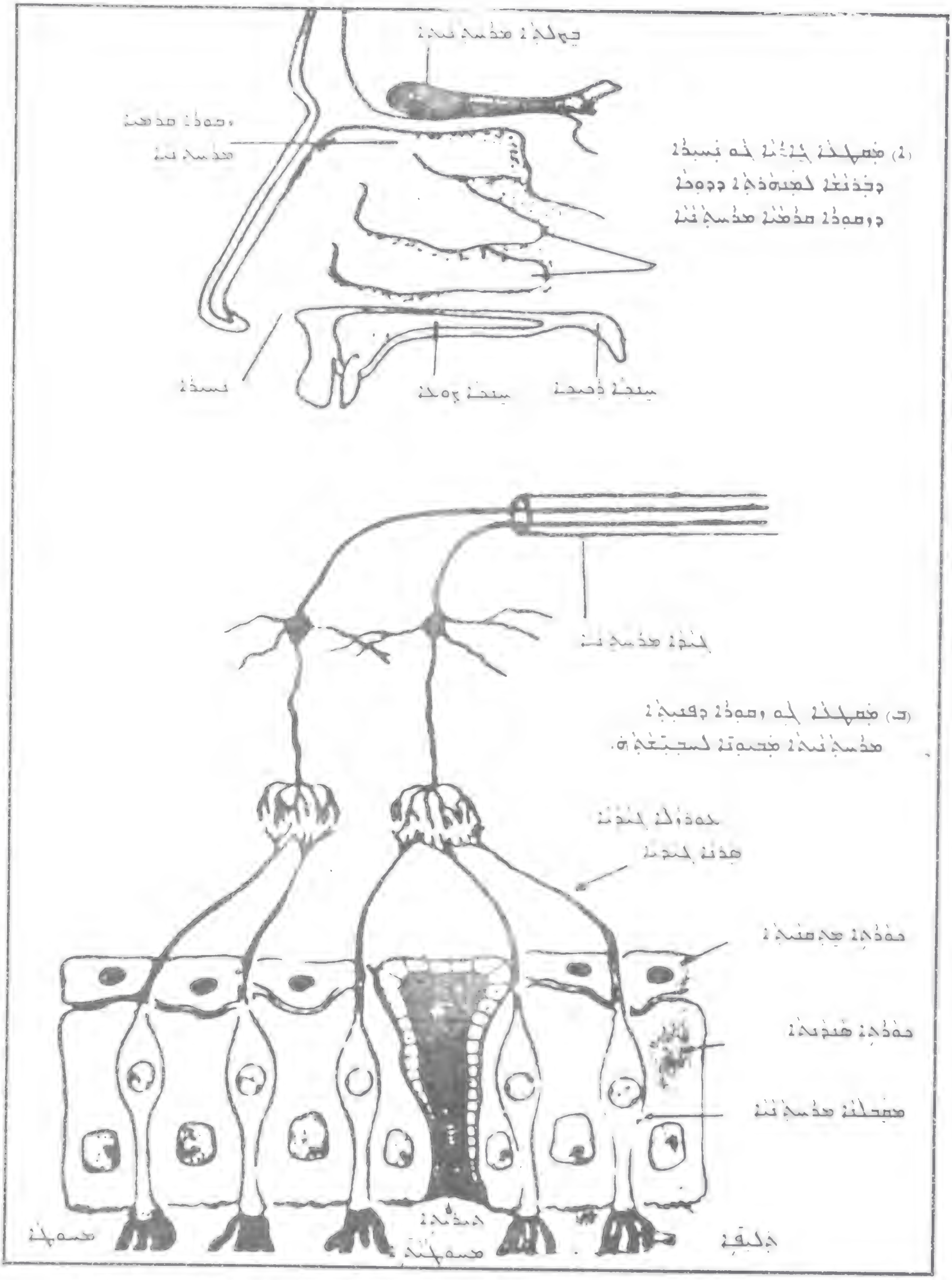
ܒܗܕܐ ܡܪܓܫܢܘܬܐ ܝܠܝܗ ܒܐܕܫܐ ، ܐܝܟ ܗܘܝܢ ܡܪܓܫܢܝܬܐ ܦܓܪܢܝܬܐ (Epitheliosensory) ، ܐܘ ܟܝܡܝܝܬܐ ܦܓܪܢܝܬܐ (Neurosensory) . ܡܬܘܕܥܐ ܝܠܗ ܐܕܫܐ ܩܕܡܝܐ ܡܢ ܗܕܐ ܡܕܥܢܝܬܐ ܠܐ ܟܝܡܝܝܬܐ ، ܐܝܟܐ ܝܠܝܗ ܕܝܠܢܝܬܐ . ܡܬܠܒ ܠܡܘܗܪܝܐ ܡܢ ܟܝܡܝܐ . ܘܡܘܘܕܝ ܒܚܕ ܕܓܠܐ ܟܝܡܝܐ ܦܓܪܢܝܐ ܡܢ ܟܝܡܝܐ ܐܚܪܢܐ . ܐܝܟܐ ܐܕܫܐ ܚܕܢܝܐ ، ܗܘ ܝܠܗ ܒܗܕܐ ܟܝܡܝܝܬܐ ܡܬܘܣܠܦܐ . ܡܠܝܒ ܡܢ ܚܕ ܟܝܡܝܐ ܢܚܝܪܘܬܐ ܡܪܗܒ ܠܦܪܟܘܝܐ ، ܕܡܬܠܒ ܡܘܗܪܝܐ . ܘܡܪܘܠܝ ܡܢ ܟܝܡܝܐ ܐܚܪܢܐ . ܒܚܕ ܗܪܢܝܐ ܝܢ ܒܗܕܐ ܟܝܡܝܝܬܐ ܐܚܪܢܝܬܐ ܘܦܠܚܐ ܗܘܝ ܗܢܐ ܐܕܫܐ ܡܢ ܐܝܟ ܡܪܓܫܢܘܬܐ . ܐܘܦܩܬܐ ܠܒܗܕܐ ܗܢܕܝܬܐ . ܐܘ ܗܪܡܐ ܕܪܓܫܐ ܒܣܘܐ .

٤ ـ ١١ ـ ܐܕܫܐ ܕܡܪܓܫܢܘܬܐ ܦܓܪܢܝܬܐ ܐܘ ܦܝܙܝܩܝܬܐ :

٤ ـ ١١ ـ ١ ـ ܡܪܓܫܢܘܬܐ ܒܡܫܘܫܐ :

ܐܝܬܝܢ ܡܪܓܫܢܘܬܐ ܕܩܪܝܒܘܬܐ ܘܡܫܘܫܬܐ ، ܐܝܟ ܕܡܘܕܥܐ ܠܚܘܫܐ ܒܝܘܬܐ ܒܝܕ ܒܝܫܘܬܐ ܕܦܓܘܕܐ ، ܐܝܟ ܥܩܘܬܐ ܕܡܛܠܘܬܐ ܚܪܝܦܬܐ ܘܥܡܝܩܬܐ ، ܘܪܦܝܬܐ ܕܒܠܒܘܫܐ ܐܘ ܓܘܪܐ . ܘܐܦ ܗܘܪܡܐ . ܘܬܠܬܐ ܕܗܦܟܬܐ ܕܗܕܐ ܓܘܫܐ ܕܒܪܐ ܘܝܡܝܢܐ (Mates) ، ܘܐܝܟ ܐܘ ܕܚܘܬܐ ܕܚܘܬܐ ܠܓܠܕܐ . ܒܫܦܝܪܘܬܐ ܕܚܘܠܡܐ ܟܝܡܝܐ ܚܕܪܐ . ܦܪܝܫܬܐ ܝܠܗ ܡܪܓܫܬܐ ، ܕܗܘ ܝܠܗ ܦܓܪܐ ܡܢܪܐ ܒܘܩܪܐ ܕܐܦܝܢܐ ܪܓܝܫܐ . ܘܡܢܝ ܚܘܬܐ ܡܢܝܢܐ ܕܡܪܚܩ ܚܘܦܐ ܕܡܛܠܘܬܐ ܒܝܬܝܬܐ ، ܘܚܘܬܐ ܬܪܝܢܝܬܐ ܕܡܪܚܩ ܡܛܠܘܬܐ ܒܝܬܝܬܐ ܦܪܘܫܐ . ܐܘ ܐܦܠܐ ܒܚܠܬܐ ܡܚܠܝܬܐ ܪܒܬܐ . ܘܐܦ ܡܪܓܫܬܐ ܕܚܘܦܐ ܕܚܘܒܐ ܒܝܪܟܐ .

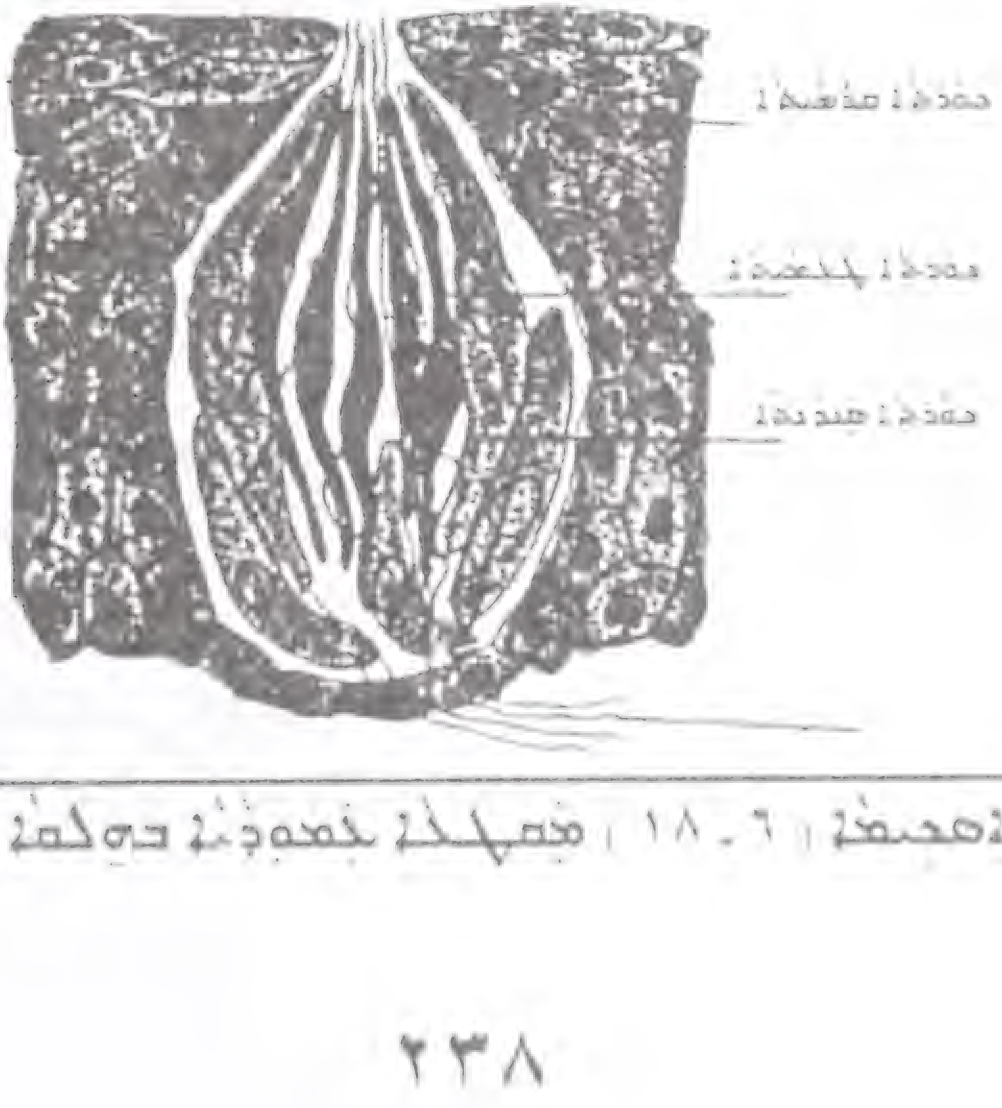
ܐܝܟ ܡܪܓܫܢܘܬܐ ܕܡܪܓܫܬܐ ܐܘ ܦܝܙܝܩܝܬܐ . ܒܚܕ ܗܘܡܐ ܡܢ ܩܘܡܬܐ ܡܕܡܝܐ ܡܪܐ ܡܝܬܝܐ . ܗܘ ܕܡܝܬܝ ܠܗܘܡܐ ܝܠܢܐ ܡܢ ܐܦܝܐ ܒܣܪܝܐ (ܝܗܝܡܐ (٦ ـ ١٧) .



ܨܘܪܬܐ (٦ - ١٧) ܐ - ܡܚܘܝܢܐ ܓܪܡܢܐ ܓܘ ܢܚܝܪܐ ܕܒܪܢܫܐ
ܠܦܘܪܫܬܐ ܕܕܘܟܬܐ ܕܩܘܪܐ ܡܪܡܢܐ ܡܪܚܢܝܐ.
ܒ - ܡܚܘܝܢܐ ܓܘ ܩܘܪܐ ܕܦܣܬܐ ܡܪܚܢܝܬܐ ܡܚܘܝܢܐ ܠܚܒܝܫܘܬܐ.

ܘܡܬܚܙܝ ܕܒܠܐ ܟܢܘܫܐ ܡܢ ܐܢܐ ܦܣܝܐ ܒܐܣܦܘܓܝܘܬܐ ܕܟܢܘܫܐ . ܘܐܣܟܝ ܙܘܓ ܓܒܒܐ ܡܕܡܝܢܝܬܐ ܠܗ ܕܡܓܒܐ . ܘܟܠ ܗܘܝܐ ܕܡܡܠܠܢܝܬܐ ܡܕܡܝܢܝܬܐ ܚܕ ܠܗ ܚܕ ܚܘܪܐ ܒܡܘܫܠܗܘ. ܕܡܥܒܪ ܕܡܪܝܡ ܐܪܒܥܐ ܡܫܠܡܬܐ ܡܢ ܕܡܐ .

ܗܟܢ ܡܡܠܠܢܝܬܐ ܕܓܒܡܬܐ ܠܗ ܚܘܪܐ ܒܡܘܦܪܝܘܬܗ ܒܢܝܫܬܐ ܡܕܡܝ ܒܢܘܫܐ ܠܗܘܢܐ . ܒܗܕ ܡܠܘܐܐ ܒܡܥܢܐ ܐܢܝ ܕܐܝܬ ܠܗ ܟܘܕܡܐ . ܐܝܬ ܐܢܐ ܡܡܠܠܢܝܬܐ ܠܗ ܚܠܒܢܝܬܐ ܒܐܣܦܘܓܝܘܬܐ ܕܟܘܠܝܬܐ ܓܒܝܬܐ . ܘܐܢܝ ܚܠܗ ܒܘܪܐ ܡܢ ܒܗܕܐ ܡܕܡܝ ܟܠܒܐ ܐܪܒܥܐ . ܢܦܠ ܠܗ ܣܦܝܕܬܐ ܓܠ ܓܗܝܫܐ ܕܠܒ̈ܐ (ܨܘܪܬܐ ٦ - ١٨) . ܘܗܕܐ ܠܡܠܘܐܐ ܒܡܥܢܐ ܦܪܝܫܐ . ܠܦܘܬ ܕܒܝܫܗ ܡܢ ܓܗܝܫܐ ܕܠܒ̈ܐ . ܘܡܫܢܝܬܐ ܠܗ ܐܪܒܥܬܐ ܕܐܪܒܟܐ ܓܘܦܐ ܡܢܝܗ . ܘܐܢܝ ܚܠܗ ܡܡܠܠܢܝܬܐ ܕܚܠܒܘܬܐ ܘܡܣܡܘܟܘܬܐ ܘܡܠܘܫܘܬܐ ܘܡܪܒܝܘܬܐ . ܡܕܡܝܬܐ ܐܝܬ ܒܪܒܐ ܕܠܒ̈ܐ . ܘܐܫܪܫܬܐ ܒܫܪܗ . ܐܢܐ ܡܡܠܠܢܝܬܐ ܕܡܣܡܘܟܘܬܐ ܘܡܠܘܫܘܬܐ ܒܒܪܝ ܡܪܘܝܗ . ܡܒܘܗܦ ܡܡܠܠܢܝܬܐ ܐܫܪܫܬܐ ܕܐܝܬ ܓܠ ܠܒ̈ܐ ܒܐܨܛܪܐ ܕܦܘܡܐ . ܕܦܘܦܬܐ ܠܪܒܝܐ ܕܡܪܣܬܐ . ܒܗܘܠܬܐ ܕܡܓܒܠܬܐ ܓܒܡܗ ܘܓܒܡܘܬܗ .



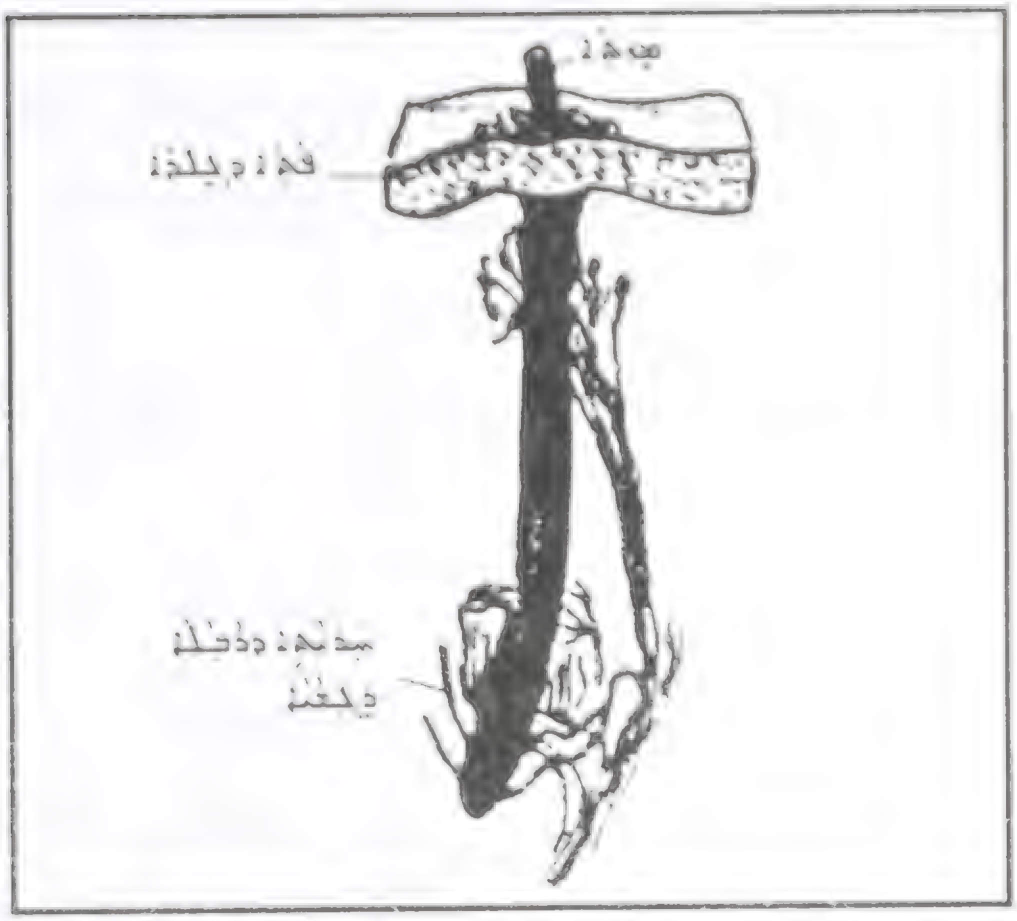
ܨܘܪܬܐ (٦ - ١٨) ܡܫܩܠܬܐ ܢܩܘܒܐ ܕܟܘܠܝܬܐ ܓܒܡܬܐ

ܗܕܐ ܕܣܟܐ ܒܥܒܕܢܘܬܐ ܟܠ ܡܬܕܒܪܢܘܬܐ ܕܡܠܘܐܐ ܒܥܡܠܐ ܠܗ ܡܫܡܠܝܐ . ܘܦܘܫܩܐ ܕܐܘܐ ܡܬܕܒܪܢܘܬܐ ܠܗ ܕܡܕܝܢܬܐ . ܘܡܚܕܐ ܠܐ ܝܠܗ ܡܠܝܐ ܒܢܚܐ . ܐܦ ܦܪܫܐ ܡܢܐ ܦܪܨܘܦܐ ܒܝܠܥܡܐ ܕܡܕܒܪܢܐ ܡܠܘܐܐ ܐܝܟ ܦܝܫܠܐ ܡܫܬܪܫܝܢ . ܗܘ ܕܒܝܬ ܠܗ ܦܪܝܫܐ ܠܗܘ ܡܕܒܪܢܐ ܦܪܨܘܦܐ . ܘܗܘ ܡܕܒܪܐ ܐܘ ܡܠܘܐܐ ܠܗܘ ܒܘܢܝܐ ܐܚܪܢܐ ܡܢ ܦܪܨܘܦܐ . ܘܡܚܠܦ ܐܢܐ ܦܘܪܫܢܐ ܚܕܢܝܐ ܠܦܘܪܫܢܐ ܡܘܠܝܐ .

٤ ـ ١١ ـ ٢ ـ ܡܫܡܠܝܢܘܬܐ ܐܘܪܓܢܝܬܐ

ܘܒܝܢܗ ܚܕܢܝܬܐ ܐܢܫܝܬܐ ܚܕܢܝܬܐ ܡܫܝܢܬܐ ܦܪܢܣܘܬܐ . ܐܘ ܡܫܬܡܫܢ ܒܟܘܪܗܐ ܕܐܠܗܐ . ܘܦܪܢ ܠܗ ܐܠܗܐ ܘܡܫܡܫܢܘܬܐ . ܘܐܠܗ ܢܗܪܐ ܘܢܘܗܪܐ ܐܘܦܝܐ ܠܗ ܠܥܡܐ .

ܡܢܢ ܐܠܗܐ ܕܩܪܝܬܐ ܟܠ ܡܫܡܠܝܢܘܬܐ ܐܘܪܓܢܝܬܐ . ܐܝܢܐ ܐܝܬ ܡܘܕܝܢ ܒܪܒܐ ܕܐܢܫܐ . ܦܠܢ ܘܗܕܐ ܡܫܡܠܝܢܘܬܐ ܐܘܪܓܢܝܬܐ ܒ ܒܡܘܫܚܘܬܐ ܡܫܬܡܫܢܬܐ ܟܠ ܦܢܝܬܐ ܥܒܕܢܝܬܐ ܐܠܗܐ . ܐܝܟ ܕܒܪܢܐ ܒܝܬܥܡܐ . ܐܘ ܒܪܢܫܐ ܕܫܘܦܐ ܕܗܘܡܐ ܡܢ ܐܠܗܐ . ܘܒܐܝܬܘܬܐ ܕܡܪܚܡܢܐ . ܘܒܬܪܗ ܙܘܪܐ ܡܢܝܢ ܠܕܡܕܝܢܬܐ ܢܒܝܐ . ܗܘܒܠܗ ܡܢܝܢܬܐ ܕܡܢܐ ܒܣܪ ܠܥܡܐ ܒܪܐ . ܐܘ ܙܘܢܐ ܕܣܪ ܗܘܡܐ ܡܢ ܗܘܡܐ ܕܠܥܡܗ . ܘܐܠܗ ܫܠܡܢܝܬܐ ܐܝܟ ܐܠܗܐ ܡܢ ܚܕܢܝܬܐ ܕܣܪ ܕܚܠܐ ܕܐܢܫܐ . ܒܡܫܡܫܢܐ ܕܟܠ ܡܢܐ . ܒܪܢ ܠܗܘ ܕܡܫܡܫܢܬܐ ܐܢܫܝܬܐ . ܐܦ ܒܟܕܢܝܐ ܕܡܫܡܠܝܬܐ ܕܡܢܐ ܒܡܫܡܫܢܘܬܐ . ܐܡܡܢ ٦ ـ ١٩) . ܘܐܝܬ ܠܗ ܒܘܡܫܡܫܢܬܐ ܘܫܠܡܘܬܐ . ܡܫܡܠܝܢܘܬܐ ܕܡܫܚܠܦܢܘܬܐ . ܘܡܫܡܫܢܐ ܡܢܐ ܒܡܘܫܚܐ ܕܡܫܡܫܢܢܘܬܐ . ܘܡܬܝܠܕ ܡܢ ܟܕܐ ܐܢܫܐ ܒܫܠܝܛܘܬܐ ܟܠ ܘܡܢܐ ܕܗܘܡܐ ܕܦܠܚܐ ܘܡܢܗ . ܘܐܝܬ ܠܗܘ ܡܬܕܒܪܢܘܬܐ ܒܐܡܝܢܐ ܕܗܘܡܐ ܘܗܘܡܐ .



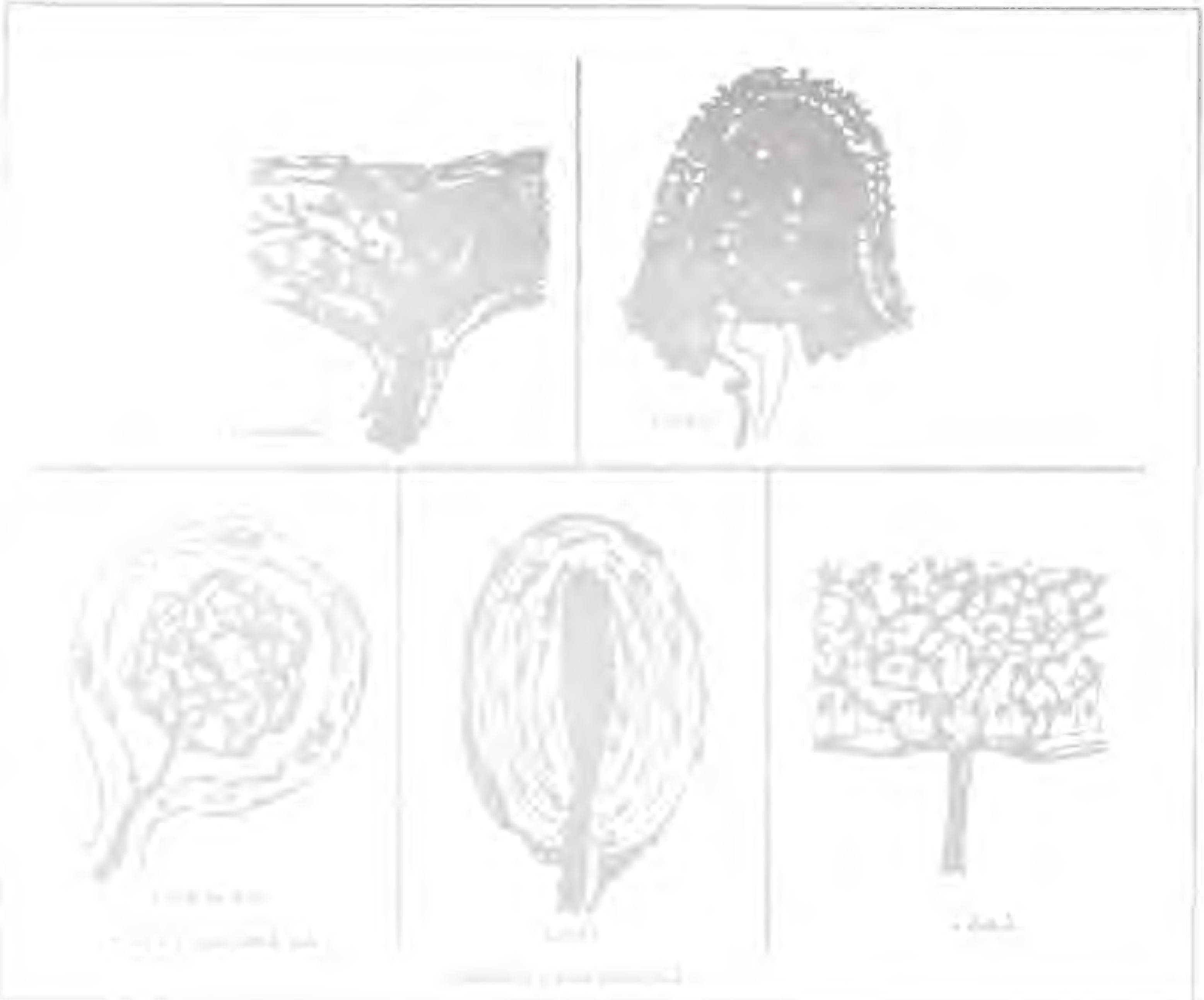
ܨܘܪܬܐ (٦ - ١٩) ܓܙܪܐ ܕܐܪܒܠܐ ܓܢܒܝܐ ܠܗܘ ܡܢܗܪܐ ܕܡܘܬܐ .

٤ — ١١ — ٣ - ܡܫܒܠܢܘܬܐ ܢܫܒܫܘܒܝܬܐ :

ܒܝܪܬܐ ܕܗܡܘܡܬܐ ܒܗܕ ܡܫܒܠܢܘܬܐ ܐܘܪܓܢܝܬܐ ، ܣܘܐܓ ܕܐܝܟ ܦܪܗܒ ܠܗ ܓܠܕܐ ܡܫܒܠܢܘܬܐ ، ܠܐ ܗܢܐ ܐܠܐ ܣܪܢܝܬܐ ܓܢܒܢܝܬܐ ܣܘܪܢܝܬܐ . ܐܘ ܒܠܚܕ ܗܘܝ ܠܐ ܓܢܒܢܝܬܐ ، ܘܡܢܝܢ ܗܘܝ ܒܨܘܪܬܐ ܕܒܠܘܡܝܢܐ ، ܐܝܟ ܕܒܠܘ ܐܢܫܘܬܐ ܠܗ ܠܘܬܡܘܢܝܬܐ ܕܓܪܘܗ ܘܡܫܝܪ ܘܬܫܒܒ (ܨܘܪܬܐ ٦ - ٢٠) . ܐܘ ܒܠܚܕ ܗܘܝ ܠܠܒܘܢܝܬܐ ܡܢ ܟܠ ܒܠܘܡܝܢܐ ، ܐܝܟ ܣܪܢܝܬܐ ܓܢܒܢܝܬܐ ܪܘܦܢܝܬܐ .

ܦܪܝܐ ܡܘܕܝܪܬܐ ܠܠܘܬܡܘܢܝܬܐ ܕܓܪܘܗ ، ܢܣܒܬܐ ܕܡܪܝܪܘܬܐ ، ܘܠܣܪܢܝܬܐ ܕܪܘܦܝܢ ܢܣܒܬܐ ܕܢܣܝܒܘܬܐ . ܘܡܫܬܠܚܬܐ ܕܐܝܟ ܣܘܓܪܐ ܣܦܪܢܐ ܢܫܒܫܬܐ ܐܘ ܡܪܝܪܐ ، ܡܢܝܢܬܐ ܠܗ ܕܟܡܬܐ ܕܡܦܩܐ . ܠܐܝܕܘܬܐ ܕܐܝܟ ܡܫܒܠܢܘܬܐ ܠܗ ܓܠܕܐ . ܘܗܘܡܟܠܐ ܢܫܒܫܘܒܝܬܐ ܠܗ ܢܣܘܐ ܡܣܠܦܐ ܗܡܝܢ ܢܫܒܫܘܬܐ ܐܢܫܐ ܠܗ ܕܟܐ ، ܡܗܝܠܠܘܦ ܟܠ ܕܫܡܬܐ ܡܢ ܗܕܐ ܢܫܒܫܘܒܝܬܐ ܗܘܦܝܢ ، ܘܡܫܘܠܡܘܬܐ ܡܠܝܢ ܠܡܘܠܕܐ ܢܫܒܫܘܒܝܬܐ ܣܒܝܢܐ .

ܘܠܗ ܚܕܐ ܦܠܓܘܬܐ ܚܫܝܫܘܬܐ. ܡܫܘܕܥ ܐܝܟ ܡܫܠܡܢܘܬܐ
ܟܡܝܠܝܘܢܝܘܬܐ ܕܙܪܥܐ ܕܚܫܝܫܘܬܗܘܢ. ܟܕ ܐܝܬ ܠܗ ܦܘܫܐ ܦܪܝܫܐ ܡܢ
ܙܪܥܐ. ܘܗܘܐ ܙܪܥ ܠܗܘܢܐ ܦܪܝܫܐ. ܡܬܚܙܝܐ ܠܟܢܫܐ ܚܫܝܫܘܬܢܐ
ܡܫܘܕܥ ܒܫܘܬܐ ܕܙܪܥܐ ܕܚܫܝܫܘܬܐ ܕܠܘܬܗܝܢ. ܡܢ ܠܗ ܒܘܫܠܐ
ܕܡܠܘܐܐ ܚܝܐ.



[illegible]

٤ — ١١ — ٤ — ܡܪܓܫܢܘܬܐ ܕܫܘܝܘܬܐ :

ܝܠܗ ܚܕ ܐܚܪܢܐ ܡܢ ܡܪܓܫܢܝܬܐ ܐܦܪܫܝܬܐ ، ܘܒܝܬܐ ܡܢܐ ܕܝܠܢܝܬܐ ܠܒܝܬܐ ܕܫܘܝܘܬܐ . ܒܝܕ ܙܘܙܐ ܕܐܦܪܫܝܬܐ ܫܢܝܬܐ ܡܫܬܪܘܬܐ ܒܝܕܥܬܐ ܒܘܕ ܗܡܫܘܬܐ ܕܓܘܫܡܐ . ܠܫܪܪܬܗ ܠܫܘܒ ܢܦܫܘܬܐ . ܡܫܘܕܥܐ ܝܠܗ ܗܕܡܐ ܕܫܘܝܘܬܐ ܒܐܪܐܝܬ ܡܢ ܒܝܬܐ ܕܩܛܡܘܬܐ (Statocyst) ، ܘܗܘ ܝܠܗ ܒܝܬܐ ܕܟܦܐ ܡܠܝܐ ܒܫܠܐ . ܡܐܝܬܐ ܒܡܫܟܢܐ ܡܢܟܝ ܣܘܬܬܐ (Hair Cells) ، ܘܡܫܒܚܐ ܥܠ ܣܘܬܘܢܝܬܐ ܕܐܝܬ ܒܡܫܟܢܐ ܒܘܫܟܐ ܕܩܛܡܘܬܐ (Statolith) .

ܘܗܘܐ ܝܠܗ ܦܪܕܬܘܢܝܬܐ ܡܫܘܕܥܐ ܒܫܘܝܐܝܬ ܡܢ ܫܪܟܘܢܝܬܐ ܕܓܠܝܫܘܗ .

ܘܠܗ ܦܫܪܬܢܝܬܐ ، ܗܘܝ ܗܕܡܐ ܕܫܘܝܘܬܐ ܚܕ ܗܫܡܐ ܡܢ ܐܕܢܐ ܓܘܝܬܐ ܐܝܟ ܒܝܬܐ (Saccule) ܘܫܪܫܘܠܬܘܒܬܐ (Utricle) . ܘܟܠܗ ܐܢܐ ܐܝܟܢܘܬܐ ܡܫܕܪܝ ܐܝܬ ܕܘܟܬܐ ܗܕܡܐ ܕܫܘܝܘܬܐ ܠܟܝܢܐ (ܗܫܡܐ) ، ܘܗܘܝ ܝܕܥܬܗ ، ܒܘܕ ܗܡܫܘܬܐ ܕܪܫܐ ، ܘܫܩܝܠ ܒܪܝܫܬܐ ܒܗܡܫܘܬܗ ܠܟܠ ܘܠܓܢܒ ، ܐܘ ܠܦܢܝܬܐ . ܐܘ ܠܬܚܬܐ ܘܠܥܠܐ . ܘܟܠ ܐܝܟܢܘܬܐ ܕܫܟܫܬܐ ܕܚܘܬܐ ܕܚܘܐ . ܘܪܦܬܐ ܕܓܘܫܐ ܕܫܘܝܘܬܐ ، ܒܡ ܟܕ ܟܕܥܬܗ ܠܐ ܟܬܘܪܐ ܝܗܘܢܝܬ ܡܛܠܝܡ ܠܦܫܪܗ ܥܠ ܚܠܝܬܐ ܡܫܬܘܕܥܢܝܬ . ܐܘ ܡܫܕܪܬܐ ܕܗܫܡܐ ܠܐ ܟܢܢܐ . ܘܙܘܥܐ ܕܪܫܐ ، ܐܘ ܒܘܣܠܦܐ ܕܗܡܫܘܬܐ ܕܓܘܫܡܐ ܕܚܘܐ . ܡܟܕܝ ܒܘܣܠܦܐ ܕܗܫܡܐ ܕܓܘܫܐ ܕܫܘܝܘܬܐ . ܒܫܟܪܪܘܬܐ ܕܢܦܫܘܬܐ ܥܠܝܗ ، ܘܐܟܝ ܡܢ ܥܠ ܒܫܟܢܐ ܡܢܟܝ ܣܘܬܬܐ ، ܘܡܟܝ ܫܘܦܫܐ ܡܢ ܐܕܫܘ ܓܢܒܝܐ ، ܡܛܠ ܒܙܘܕܚܐ ܕܐܕܠܐ ܓܢܒܝܐ ܕܓܘܝܐ ܠܐܦܝܐ ، ܡܫܘܕܥ ܚܘܬܐ ܒܝܫܗ ܥܠ ܗܡܫܘܬܗ .

ܘܫܬܐ ܐܝܬ ܐܕܢܐ ܟܪܝܬܐ ܡܢ ܗܕܡܐ ܕܫܘܝܘܬܐ ܠܗ ܦܫܪܬܢܝܬܐ ، ܡܢ ܠܗ ܒܘܟܝܐ ܩܠܝܠ ܣܘܕܪܢܝܐ ، ܘܫܦܪܝ ܠܚܘܬܐ ܝܕܥܬܗ ܒܘܕ ܙܘܥܐ ܕܪܫܐ . ܘܟܝܫ ܗܘܝܘܬܐ ܙܘܥܐ ܠܓܘܫܡܐ (ܙܘܥܐ ܒܘܟܝܢܐ) ، ܘܫܒܪܬܐ ܕܟܠ ܒܘܟܝܐ ܩܠܝܠ ܣܘܕܪܢܝܐ ܐܝܬ ܪܒܝܫܘܬܐ ܡܫܘܫܘܬܐ ܪܒܬܐ (Ampulla) ، ܡܟܝܠܐ ܥܠ ܒܫܟܢܐ ܡܢܟܝ ܣܘܬܬܐ ، ܐܝܟ ܕܡܟܝ ܒܘܙܥܐ ܕܫܠܐ ، ܗܘ ܕܫܠܐ ܠܐܦܝܐ . ܘܒܕܝܪܐ ܕܙܘܥܐ ܕܪܫܐ ، ܟܠܐ ܫܠܐ ܡܢ ܟܠܝܬܐ ܕܫܬܠܝܬܗ (Inertia) ، ܘܐܦܢ ܕܙܘܥ ܕܡܛܐ ܠܕܘܟܬܗ ܚܕܬܐ ، ܠܗ ܒܘܟܝܐ ، ܡܟܕܐ

ܒܩܒܘܬܐ ܠܗ ܡܫܘܚܘܬܐ ܕܫܘܚܬܐ ܡܥܠܝ ܡܫܘܚܬܐ. ܘܒܬܪܗ ܕܐܢܐ
ܐܝܬܝܗ ܒܝܕܥܬܐ ܕܥܠܡܐ ܕܪܥܐ. ܘܒܐܘܪܚܐ ܕܪܡܘܙܐ ܠܐܪܥܐ. ܐܝܟ
ܕܡܬܠ ܠܪܡܙܐ. ܡܟܘܪܟ ܚܘܐ ܥܠ ܙܘܥܐ ܕܘܡܝܐ.

٤ ـ ١١ ـ ٥ ـ ܡܕܒܠܢܝܬܐ ܡܠܝܬܐ:

ܚܒܝܒ ܥܠܝܗ ܒܘܪܬܐ ܕܥܠܝܬܐ. ܒܡܟܝܬܐ ܕܟܘܚܠܐ ܕܘܪܒܐ ܠܗ ܡܪܢܐ
ܐܘ ܗܘܐ. ܘܠܐ ܚܢܐ ܗܪܡܙܐ ܕܝܡܟܐ. ܐܠܐ ܚܕ ܐܪܥܐ ܕܥܠܝܬܐ ܡܢ ܐܝܟܐ
ܡܕܒܠܢܝܬܐ. ܘܡܕܒܠܢܝܬܐ ܡܠܝܬܐ ܠܐ ܝܡܟܝܬܐ ܥܠܝܗ ܚܪܝܬܐ ܠܢܪܝܬܐ
ܚܪܝܬܐ. ܐܘ ܒܘܪܬܐ ܡܪܟܝ ܡܫܘܚܬܐ. ܐܝܟ ܒܝܠܫܐ ܕܠܘܟܡܐ. ܐܘ
ܒܘܪܟܐ ܡܢܗ. ܘܠܗ ܦܪܝܟܝܬܐ ܡܢܝܬܐ ܐܝܟ ܢܘܢܐ ܒܫܘܚ ܡܕܒܠܢܝܬܐ
ܡܠܝܬܐ ܡܬܠܘܪܢܝܬܐ ܐܝܬܝܗ. ܢܩܠ ܒܩܒܬܐ ܕܪܥܐ ܘܠܘܚܐ. ܠܗ
ܐܘܠܝܐ ܕܡܪܟܐ ܕܦܢܝܐ. ܘܗܘ ܥܠܗ ܚܕܐ ܝܥܠܬܐ ܡܢ ܒܘܒܝܐ ܡܠܝܐ ܒܚܕ
ܝܥܠܐ. ܘܡܟܝܬܐ ܒܡܫܟܐ ܒܪܝܐ ܒܐܘܪܚܐ ܕܫܘܟܐ. ܒܟܪܝܐ ܕܘܡܟܐ ܕܚܘܬܐ.
ܐܘ ܘܡܟܐ ܕܡܝܒܝ ܠܗ ܡܚܕܘܪܗ. ܙܝܕ ܝܥܠܐ ܠܗ ܒܘܒܝܐ. ܘܡܘܠܝܕ
ܪܡܘܐ ܠܢܪܝܐ ܠܗ ܒܘܪܬܐ ܡܪܟܝ ܡܫܘܚܬܐ ܡܬܠܒ ܠܪܡܙܐ. ܘܡܚܝܕܥܠܗ
ܒܡܪܐ ܕܒܪܢܐ ܥܠܗ ܒܡܚܕܘܪܗ. ܗܕܝܐ ܗܘ ܡܬܪܙ ܐܘܠܝܐ ܠܬܘܢܟܐ.
ܘܒܘܕ ܗܪܡܙܐ ܕܝܡܟܐ. ܐܝܟ ܢܪܐܝܟ ܚܕ ܘܠܐ ܡܝܢܗ ܠܗ ܚܘܬܐ
ܦܪܝܟܝܬܐ. ܢܩܠ ܠܗ ܦܢܝܬܐ ܕܪܥܐ ܒܬܪ ܬܪܝ ܢܝܐ ܘܥܠܝܗ ܬܪܬܝ
ܐܕܝܐ. ܠܢܝܒ ܐܢܐ ܗܪܡܙܐ ܠܗ ܚܕܠܢܬܐ ܡܕܡܝܬܐ. ܐܝܟ ܪܘܡܫܘܢܐ. ܐܝܢܐ
ܐܢܒ ܐܝܬ ܠܗ ܠܐ ܦܢܝܬܐ. ܘܢܘܢܐ ܥܠ ܬܪܝ ܠܢܒܢܐ ܕܪܥܐ ܡܢ ܠܘܢܐ.
ܘܡܬܘܪܙܐ ܡܢܐ ܡܢ ܐܝܢܐ ܠܘܢܬܐ. ܘܡܬܘܪܙܬܐ ܥܠܗ ܠܗ ܒܪܡܢܝܬܐ
ܘܪܥܘܦܐ ܘܠܒܕܐ ܡܢ ܬܪܝ ܬܗܡܢ. ܐܝܢܐ ܠܘܢܬܐ ܘܐܝܢܐ ܡܫܠܝܬܐ. ܘܙܢܕܐ
ܐܝܬܝܗ ܡܠܒܕܘܬܐ ܠܗ ܚܠܒܢܝܬܐ. ܘܒܫܘܚ ܚܕܐ ܐܝܢܐ ܡܬܘܪܙܬܐ
ܡܢ ܬܠܬܐ ܬܗܡܢ. ܦܪܐ ܡܢܐ ܒܝܢܝܐ ܒܐܝܢܐ ܒܪܬܐ ܘܡܫܠܝܬܐ ܘܐܝܢܐ
ܠܘܢܬܐ. ܡܢܝܢ ܡܠܐ ܠܗ ܦܪܝܟܝܬܐ ܬܪܬܝܬܐ ܠܬܒܠܬܐ. ܘܗܝ ܥܠܗ ܚܕ
ܝܠܟܐ ܕܪܝܕ ܠܚܠܒܠܘܬܐ ܕܐܝܢܐ ܡܫܠܝܬܐ. ܒܐܘܪܚܐ ܕܬܠܬܐ ܠܪܡܙܐ
ܘܬܘܪܐ. ܥܠܝܗ ܠܪܘܡܬܐ ܘܡܝܢܐ ܘܪܒܝܢܐ. ܬܪܐ ܡܝܢܗ ܚܕ ܠܒܪܬܐ
ܡܕܒܠܝܐ ܠܬܠܐ. ܒܢ ܐܝܢܐ ܡܫܠܝܬܐ ܘܐܝܢܐ ܠܘܢܬܐ. ܒܕ ܗܡܝܢ ܠܪܡܙܐ

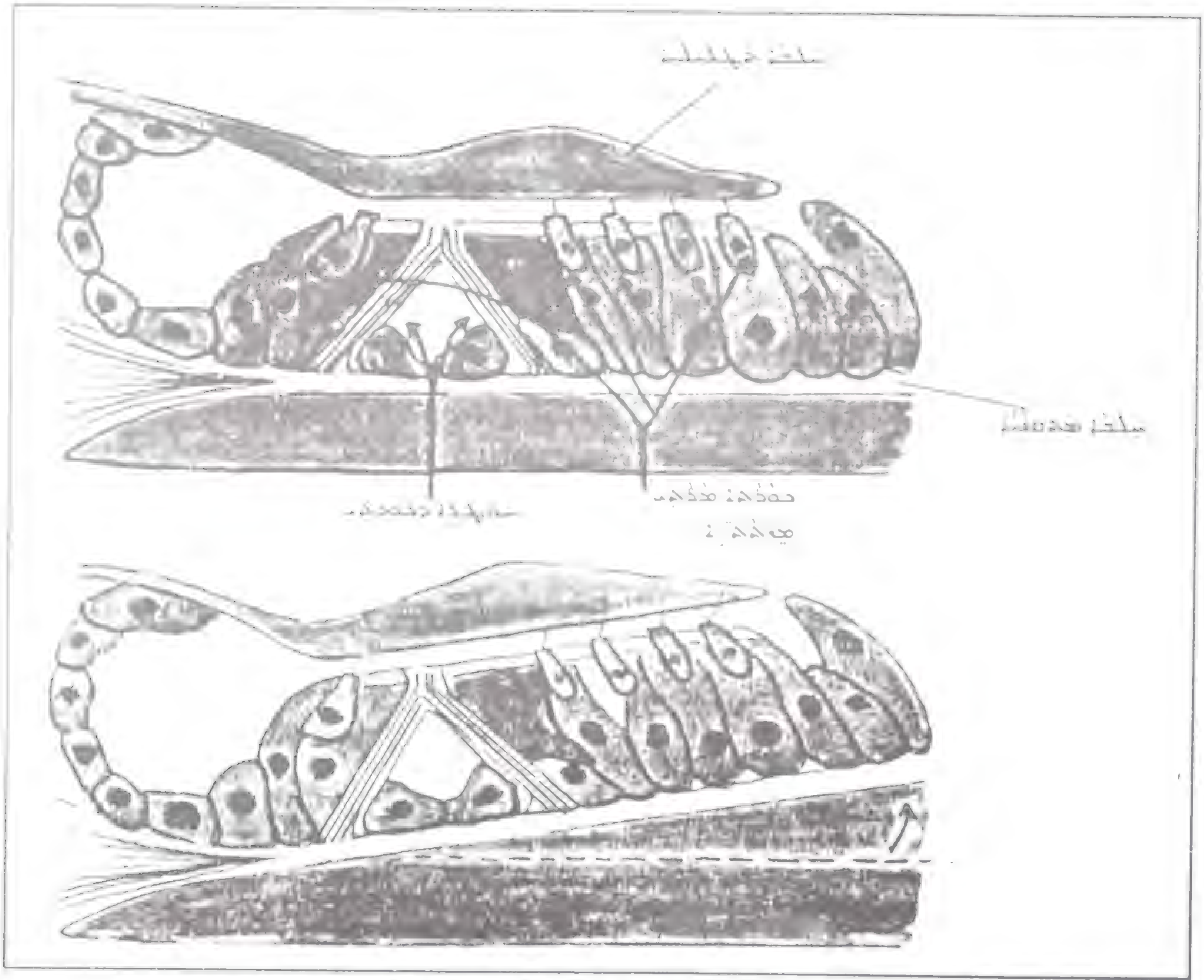
ܡܛܝܐ ܥܠ ܦܬܟܪܬܐ ، ܘܐܬܦܣܩܬܐ ܥܠ ܚܝܠܐ ܗܘܝܐ ܕܡܬܬܢܝܬܐ ܠܐܕܢܐ ܠܗܘܢ (ܨܘܪܬܐ (٦ ـ ٢١) .



ܨܘܪܬܐ (٦ ـ ٢١) ܐܕܢܐ ܕܒܪܢܫܐ

ܡܬܦܠܓܐ ܗܿܝ ܐܕܢܐ ܠܬܠܬܐ ، ܚܕ ܐܕܢܐ ܡܫܬܠܡܬܐ ܡܬܩܪܝܐ ܡܢ ܒܪܝܬܐ ܡܬܐܡܪܐ ܡܢܗܿ ܒܝܕ ܚܝܠܐ ܡܬܚܘܝܢܐ ܠܩܠܐ . ܘܡܬܚܘܐ ܡܢ ܒܝܬ ܦܠܓܗ ܡܨܥܝܬܐ . ܡܬܩܪܝܐ ܗܿܝ ܡܢ ܦܘܠܚܢܐ . ܘܗܘ ܗܿܘ ܗܘܝܐ ܡܢܗ ܕܡܐ . ܡܬܩܪܝܐ ܒܓܘܗ ܡܢ ܬܠܬ ܓܪܡܐ . ܓܪܡܐ ܩܛܝܢܐ ܡܫܡܗܐ ܡܪܛܘܠܐ . ܘܓܪܡܐ ܦܫܝܛܐ ܡܫܡܗܐ ܣܢܕܐ . ܘܬܠܬܝܐ ܕܪܟܒܝܐ ܐܝܟ ܪܟܝܒܐ . ܒܬܪܟܢܝܐ ܐܡܝܪܐ . ܗܘ ܕܝܢ ܐܝܟ ܥܘܩܒܬܐ ܡܢ ܒܝܬܐ . ܘܐܦ ܡܬܬܩܢܐ ܗܝ ܕܡܬܠܝܐ ܠܦܠܓܗ ܠܗ . ܡܬܩܪܝܐ ܐܕܢܐ ܓܘܝܬܐ ܠܗܕܐ ܚܠܦܐ ܗܿܝ . ܥܠ ܕܗܿܘ ܡܬܩܪܝܐ ܗܿܝ ܒܓܘܝܐ ܚܠܦܝܐ ، ܘܠܗ ܚܠܦܢܝܐ ، ܐܝܟ ܚܕܐ ܬܪܥܬܐ ܠܐܦܪܬܐ ܕܡܣܬܒܪܐ . ܠܗܿܝ ܕܬܪܥܬܐ ܬܪܥܬܐ ܠܗܘܐ ܚܠܦܝܐ ، ܥܠ ܕܗܘܐ ܒܗܝܐ ܗܿܝ ܒܓܘܝܐ ܓܪܡܐ ܕܝܠܗ ܒܗܘܐ ܠܒܪܝܬܐ (Bony labyrinth) .

ܡܫܘܕܥܐ ܝܠܗ ܗܕܡܐ ܕܫܡܥܬܐ (ܗܕܡܐ ܕܟܘܪܬܝ Organ of Corti) ܝܠܗ
ܒܘܢܝܐ ܡܢ ܚܠܝܐ ܡܫܡܥܢܐ ܡܢ ܝܠܗ ܥܒܝܕܐ ܕܐܒܘܒܐ ܦܘܢܩܢܐ ܡܟܝܢ
ܐܝܟ ܕܐܒܠܐ ܒܡܘܕܥܐ ܡܕܥܝ ܡܫܡܥܐ . ܘܐܢܐ ܕܡܒܒܐ ܕܐܒܠܐ ܒܘܕܥܢܐ ܡܕܐ
ܡܫܡܥܐ ܝܠܗ ܕܐܠܘܥܕܝܐ ܠܕܢܐ ܡܠܝܐ ܦܕܥܐ . ܘܡܒܕܢܐ ܕܡܟܝܢܬܐ ܕܠܦܐ
ܡܠܝܐ ܠܦܘܢܝܘܬܐ . ܟܕܐ ܝܠܗ ܥܣܠܐ ܠܡܦܩܐ ܢܘܕܐ ܡܕܐ ܐܢܐ ܡܫܬܐ
ܡܟܝܢܐ ܒܢܘ ܠܒܠ ܘܠܕܣܐ . ܘܡܒܕܢܐ ܕܡܥܒܕܐ ܕܒܘܕܐ ܡܕܥܝ ܡܫܬܐ
ܠܚܠܝܐ ܕܟܠܠܝܐ ܕܠܝܐ ܠܒܠ ܡܢܣ . ܟܕ ܕܡܥܐ ܠܟܕܐ ܠܗܘ ܡܥܢܐ
ܠܕܡܟܝܢܐ ܒܐܘܕܢܐ ܕܕܒܠܐ ܕܠܒܝܢܐ . ܦܥܡܐ ܝܢܐ ܡܥܘܡܘܐ ܚܠܝܐ ܡܫܡܥܢܐ
ܘܒܘܕܥܐ ܡܕܥܝ ܡܫܡܥܐ ܘܚܠܝܐ ܕܟܠܠܝܐ ܒܡܘܢܥܝܗ ܒܐܘܕܐ ܕܒܘܕܥܝ
(ܨܘܪܬܐ ٦ ـ ٢٢) . ܡܢ ܟܕܢܥܐ ܒܡܟܝܢܘܬܐ ܕܐܢܐ ܗܕܡܐ ܕܫܡܥܐ ܡܠܐ
ܡܕܐ ܕܢܐ ܡܟܝܢ ܒܢ ١٦،٠٠٠ ܢܘܕܐ ܝܠܗ ܣܒܕ ܕܦܩܐ . ܘܝܠܗ ܒܠܚܐ
ܡܟܝܢ ܠ ٣٠،٠٠٠ . ܘܝܠܗ ܦܕܣܕܘܕܐ ܡܟܝܢ ܠ ١٠٠،٠٠٠ .

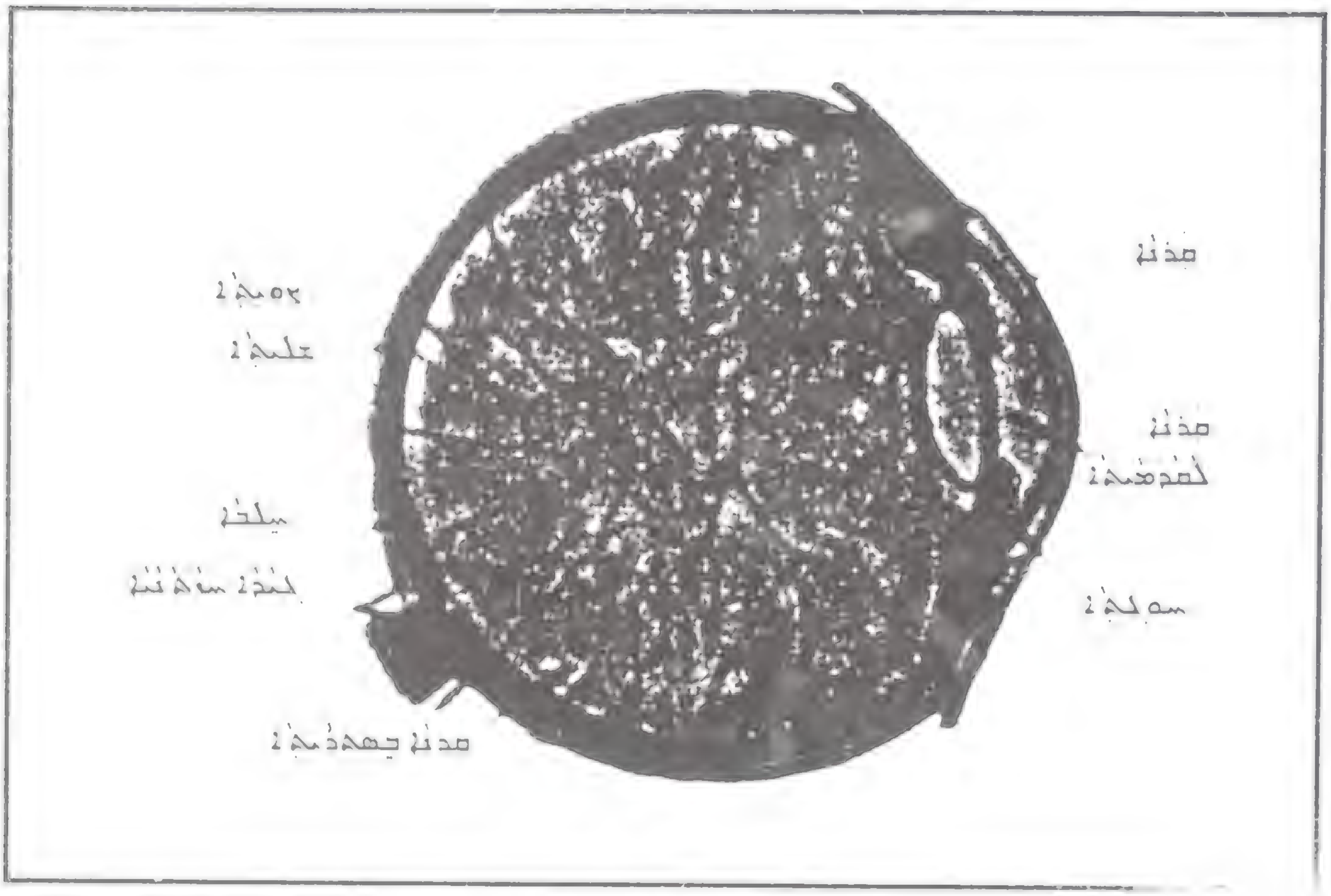


ܨܘܪܬܐ (٦ ـ ٢٢) ܡܢܣܘܕܐ ܠܗܕܡܐ ܕܫܡܥܐ (ܗܕܡܐ ܕܟܘܪܬܝ)

٤ ـ ١١ ـ ٦ ـ ܡܫܬܠܡܢܘܬܐ ܡܠܝܐ :

ܡܬܘܕܥܐ ܗܢܐ ܡܫܬܠܡܢܘܬܐ ܟܘܠܝܬܐ ܠܗ ܚܣܝܪܘܬܐ ܡܢ ܗܘܪܡܘܢܝܬܐ ܕܗܘܪܡܘܢܝܬܐ . ܡܬܝܠܕ ܥܠ ܝܘܒܠܢܐ ܟܘܠܝܬܐ ܡܪܡܢܝܢܝܬܐ ܒܝܡܢܐܝܬ ܠܗ ܕܡܐ ܕܚܣܘܕܐ . ܘܥܠ ܝܘܒܠܢܐ ܡܬܘܕܥܐ ܠܗ ܡܢ ܗܕܐ ܗܘܡܐ . ܚܕ ܗܘܡܐ ܡܕܘܡܝܐ ܠܗ ܒܡܠܘܐܐ ܕܪܓܝܫ . ܘܗܘ ܡܫܘܕܥܐ ܠܗ ܡܢ ܒܝܡܝܢ (ܐ) . ܘܚܕ ܗܘܡܐ ܡܕܘܡܝܐ ܕܐܘܟܝܢ ܦܪܘܛܝܢܐ . ܘܠܗ ܕܐܝܬ ܗܪܘܪܘܬܐ . ܡܬܚܠܦ ܗܘܡܐ ܟܘܠܝܬܐ ܠܗܘܡܐ ܒܡܫܝܢܐ . ܟܕ ܡܢܗ ܦܪܠܝܘܬܐ ܒܡܫܝܢܝܬܐ . ܟܘܠܝܬܐ . ܡܟܕ ܒܝܪܡܘܗ ܗܘܝܐ ܕܪܡܘܐ ܠܢܝܪܐ ܠܗ ܪܓܠܐ ܠܢܝܪܐ . ܐܝܟ ܕܡܘܕܝ ܠܡܫܬܠܡܢܘܬܐ ܟܘܠܝܬܐ . ܠܐܝܬܠܗܘܢ ܠܪܡܝܐ . ܗܘ ܕܡܬܪ ܠܡܠܘܢ ܠܐܫܟܚܐ ܕܡܬܚܘܝܢܝܬܐ .

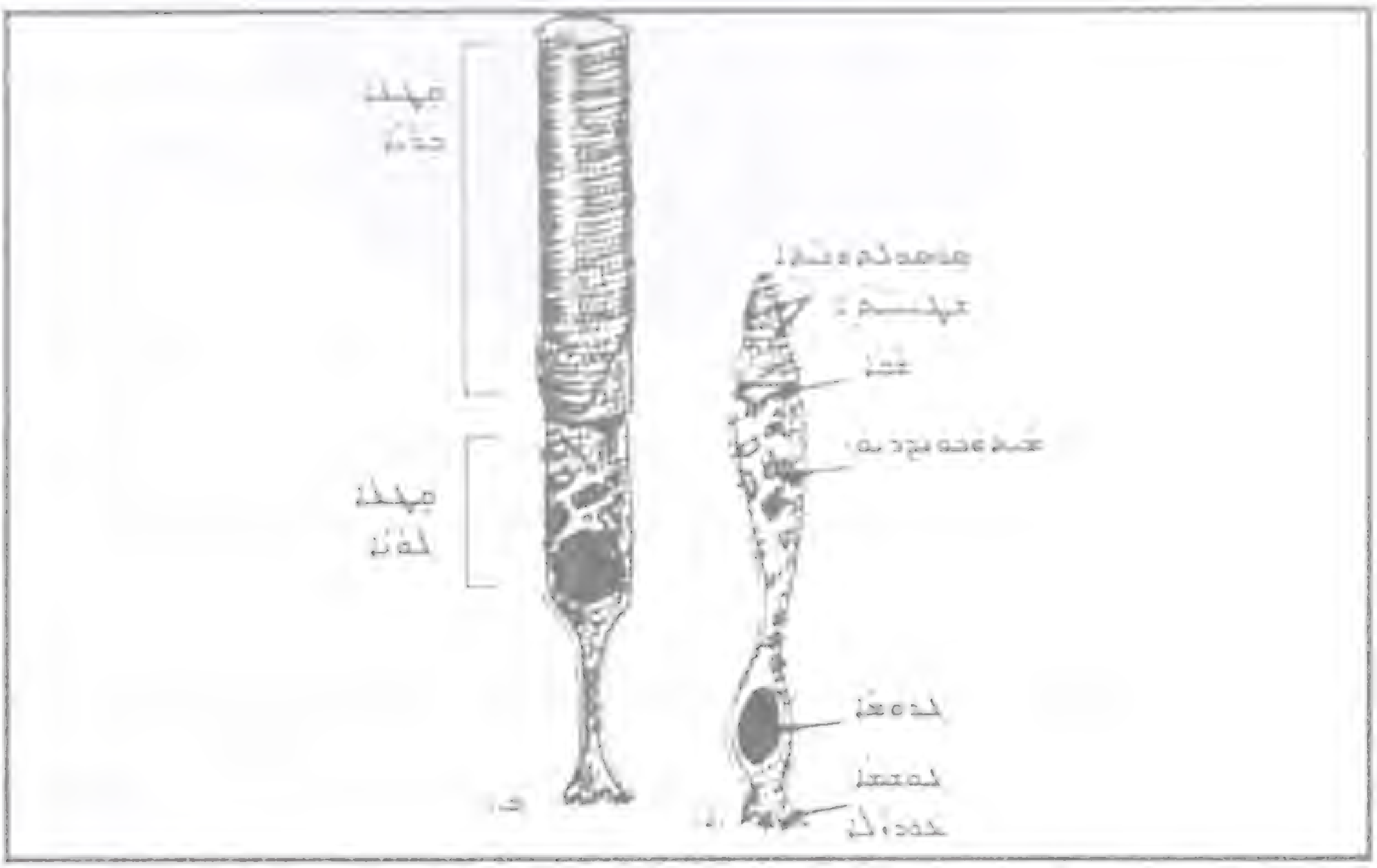
ܐܝܬ ܡܫܬܠܡܢܘܬܐ ܟܘܠܝܬܐ ܠܗ ܦܡܪܬܢܝܬܐ . ܠܝܬ ܗܘܪܡܐ ܕܚܘܫܬܐ (ܢܒܝܢܐ) . ܘܐܝܬ ܒܠܝܘܗ ܚܕ ܪܘܚܢܐ ܠܠܘܠ ܐܫܟܚܐ ܡܢ ܟܪܝܐ . ܟܠ ܕܐܝܬ ܦܝܫܐ ܠܗ ܡܕܢܐ ܐܫܟܪܘܢܐ ܕܢܒܝܢܐ ܐܘ ܠܠܝܬܐ . ܡܬܘܕܥܐ ܠܗ ܢܒܝܢܐ ܡܦܫܐܝܬ ܡܢ ܗܠܗ ܢܪܡܬܐ . ܘܒܠܝܘܗ ܒܫܪܝܪܘܬܐ ܡܢ ܟܪܝܐ ܠܓܘܝܐ . ܙܘܝܬܐ (ܘܡܬܘܡܘܬܐ ܠܗ ܚܪܡܐ ܠܘܐ ܚܘܪܐ ܕܢܒܝܢܐ) . ܘܒܠܗ ܪܓܠܝܬܐ ܠܗ ܟܪܢܝܐ . ܘܡܫܬܘܫܝܬܐ ܠܗ ܪܓܐ ܡܢ ܚܠܒܢܝܬܐ ܐܣܪܢܝܬܐ . ܘܡܚܝܪܐ ܐܘ ܢܪܡܬܐ ܕܠܝܒܐ ܢܡܝܢܐ ܡܢ ܢܒܝܢܐ . ܟܣܪܐ ܢܪܡܬܐ ܗܫܚܬܐ ܒܠܗ ܡܪܢܐ . ܡܬܪܐ ܥܠܝܬܐ ܢܪܡܬܐ ܡܝܬܝܬܐ . ܘܒܠܗ ܚܕ ܪܘܚܢܐ ܡܪܢܐ . ܡܬܚܐ ܠܡܬܚܡܘܬܐ ܕܢܒܝܢܐ . ܠܡܬܪܝܬܐ ܕܐܟܘܡܐ (ܩܘܫܬܐ) (Iris) ܠܗ ܢܬܐ . ܘܗܝ ܕܐܝܬ ܒܡܝܬܘܬܗ ܚܕ ܝܘܡܐ . ܦܝܫܐ ܡܕܢܐ ܐܢܫܐ ܕܢܒܝܢܐ ܟܝܬܐ (ܐܫܟܚܐ ٦ ـ ٢٣) .



ܨܘܪܬܐ (٦ - ٢٣) ܦܣܝܩܬܐ ܐܪܥܢܝܬܐ ܡܫܪܝܬܐ ܠܗ ܥܝܢܐ

ܢܘܠܐ ܬܪܬ ܣܘܓܬܐ ܡܫܪܢܝܬܐ ܣܪܐ ܐܫܟܪܐ ܠܘܡܚܪܢܝܬܐ. ܡܛܠܐ ܟܝܘ ܛܠܝܫܬܐ ܒܡܝܬܝܘܬܐ ܕܐܫܟܪܐ ܡܥܘܡܘܐ ܐܫܟܪܐ ܬܠܬܐ. ܘܛܠܝܫܬܐ ܠܗ ܣܪ ܪܘܚܬܐ ܒܟܝܦ ܬܪܬܝ ܦܗܘܬܐ. ܦܬܐ ܒܨܬܪܬܐ ܒܝܢ ܒܟܝܦܬܐ ܠܗ ܡܢ ܦܬܐ ܠܡܪܟܢܝܬܐ. ܘܡܥܠܠܐ ܐܫܟܪܐ ܬܠܬܐ ܒܥܘܣܠܦܐ ܕܪܬܓܐ ܕܟܝܦܘܬܐ. ܘܒܝܪܢܐ ܕܡܪܟܢܝܬܐ ܕܣܪ ܡܝܪܝ ܡܬܬܘܝܢܐ ܐܘܟ ܥܝܢܐ. ܘܣܪܐ ܛܠܝܫܬܐ ܒܟܝܦܘܬܐ. ܘܬܪܐ ܗܦܟܐ ܒܝܪܢܐ ܕܪܫܡܬܗ. ܘܗܪܒܐ ܡܬܡܚܢܐ ܥܝܢܐ ܥܠ ܪܫܡܘܬܐ ܕܡܝܪܝ ܡܬܣܘܢܝܐ. ܡܛܠܐ ܣܠܝܠܘܬܐ ܟܡ ܡܪܢܐ ܘܛܠܝܫܬܐ ܟܣܪ ܟܣܠܐ ܡܢܐ ܕܠܐ ܓܘܢܐ. ܘܥܠ ܕܐܝܟ ܦܬܐ ܡܥܘܡܘܬܐ ܒܐܛܠܝܬܐ ܡܢܝܬܐ. ܒܝܪܢܐ ܕܡܛܠܝܬܐ ܕܠܘܣܬܐ ܒܥܠܝܬܐ. ܐܝܟ ܘܢܬܐ ܥܠܝܬܢܝܬܐ. ܓܠܝܢ ܬܠܝܦܐ. ܘܦܝܬܐ ܢܢܐ ܡܥܘܡܘܐ ܒܓܘܥܡܐ ܬܠܝܦܐ. ܐܝܢܐ ܥܪܡܬܐ ܓܗܬܐ ܡܪܝܬܐ ܠܗ ܣܠܬܐ. ܘܗܝ ܡܬܘܪܙܬܐ ܠܗ ܐܫܬܝܬ ܡܢ ܬܪܬܝ ܥܪܡܬܐ. ܥܪܡܬܐ ܟܪܡܬܐ ܡܬܘܪܙܬܐ ܡܢ ܟܘܪܬܐ ܙܘܟܝܬܢܝܬܐ. ܫܟܝܟ ܥܠ ܣܪܐ ܙܘܟܝܬܐ ܐܟܘܡܬܐ. ܘܥܠ ܕܐܝܟ ܦܝܬܐ ܠܗ ܡܪܝܬܐ ܒܦܪܡܬܐ ܙܘܟܝܬܢܝܬܐ.

ܘܒܪܡܫܐ ܠܐ ܝܗܒܐ ܡܬܘܕܥܢܘܬܐ ܡܢ ܗܕܐ ܗܘܕܐ ܡܢ ܚܘܙܝܐ ܠܒܪܢܫܐ .
ܡܛܘܠ ܠܡܫܬܠܡܢܘܬܐ ܕܢܘܗܪܐ ܡܬܘܕܥܐ ܡܢ ܗܕܐ ܐܘܟܝ ܐܝܬܝܗ ܣܘܓܐܐ (
Rods) ܘܡܚܛܐ (Cones) (ܨܘܪܬܐ ٦ ـ ٢٤) ، ܐܝܟ ܕܢܦܠܝܢ ܒܕܘܟܬܐ
ܕܒܪܡܫܐ ܥܠܝܡܘܬܐ . ܟܠ ܕܐܝܬ ܗܠܝܢ ܠܚܘܕܐ ܕܒܚܕܐ ܡܢ ܠܗ ܒܪܡܫܐ
ܙܘܒܢܝܘܬܐ . ܘܗܕܐ ܗܘܕܐ ܡܢ ܚܘܙܝܐ ܠܒܪܢܫܐ . ܡܕܡ ܡܫܡܫ



ܨܘܪܬܐ (٦ ـ ٢٤) (ܐ) ܡܚܛܐ (ܒ) ܣܘܓܐܐ ܡܢ ܚܝܠܐ ܕܥܝܢܐ

ܒܡܫܬܠܡܢܘܬܐ ܕܢܘܗܪܐ . ܐܝܟ ܗܕܐ ܕܚܘܙܝܐ ܠܒܪܢܫܐ ܕܦܠܓܝܢ ܡܢ ܦܝܫܐ ܒܡܫܘܕܥܢܘܬܐ ܒܨܘܪܬܐ ܕܐܢܫܐ ܣܘ̈ܓܐܐ . ܡܕܝܢܐ ܐܠܗ ܦܝܫܐ ܕܦܠܓܐ ܕܐܢܫܐ ܣܘ̈ܓܐܐ ܟܠ ܓܘܫܡܐ ܠܗܝ ܕܚܝܠܐ . ܒܡܫܡܫܐ ܗܡܝܫܐ ܘܦܝܫܐ ܡܬܘܕܥܢܐ ܚܝܠܘܬܐ ܕܥܝܢܐ ܕܒܢ̈ܬܐ ܚܕܐ ܓܠܝܚܘܬܐ . ܘܡܠܝܫܐ ܒܚܝܠܐ ܡܕܡ ܒܚܝܠܐ ܘܓܘܒܝܬܐ . ܘܡܫܘܚܘܬܐ ܠܗ ܚܝܠܘܬܐ ܒܕܗ ܒܓܠܝܘܬܐ ܘܓܘܒܝܬܝܘܬܐ . ܗܫܡܫܐ ܐܠܗ ܦܫܝܛܐ ܗܡܝܫܐ ܡܢ ܡܫܬܠܡܢܘܬܐ ܕܢܘܗܪܐ . ܘܡܬܓܪܝܢ ܣܘܓܐܐ . ܠܗ ܦܝܫܐ ܣܓܝܐܘܬܐ ܡܢ ܚܝܠܐ . ܘܚܘܪܝ ܕܢܓܠܝܬ ܒܚܘܪ ܡܬܓܪܘ . ܣܘ̈ܓܐܐ ܕܒܢ̈ܬܐ . ܘܕܒܝܐ

ܦܩܕ ܐܦ ܦܪܝܫܘܬܐ ܕܥܠܝܡܘܬܐ ܕܡܟܝܟܘܬܐ ܕܢܟܦܘܬܐ ܘܚܣܝܘܬܐ ܐܦ ܡܫܬܥܒܕܢܘܬܐ.
ܐܝܬ ܡܘܬܒܐ ܘܦܘܩܕܢܐ ܡܢܛܪܝܢ ܠܗ ܡܢ ܬܪܥܗ. ܘܟܕ ܗܘܐ ܦܪܝܫܘܬܐ
ܕܡܫܝܚܝܘܬܐ. ܘܒܥܘܕܪܢܐ ܗܘܐ ܐܦ ܦܪܝܫܬܐ. ܐܝܟ ܕܩܕܝܫ ܠܗܘܢ ܡܘܬܒܐ.
ܕܡܫܝܚܝܘܬܐ ܕܐܬܩܢܬ ܥܠ ܫܘܬܐ ܫܪܝܪܬܐ ܫܘܬܐ ܕܫܡܝܐ
ܘܫܘܬܐ ܡܫܝܚܝܬܐ. ܐܝܟ ܠܗ ܡܢ ܬܪܥܗ. ܫܘܬܐ ܕܥܡܐ ܕܡܫܝܚܐ
ܗܝ ܦܝܫܬܐ ܣܦܝܩܬܐ ܡܢ ܟܠ ܥܕܬܐ. ܘܗܘܬ ܣܦܝܩܬܐ ܡܢ ܗܝܡܢܘܬܐ
ܘܡܘܬܒܐ ܕܥܕܬܐ. ܥܠܝܬܐ ܘܥܠܝܡܬܐ ܡܫܬܡܠܝܐ ܠܟܗܢܘܬܐ. ܘܡܫܝܚܝܘܬܐ
ܥܠܗ ܐܝܬ ܦܘܬܚܐ ܡܫܬܢܝܬܐ ܘܗܝ ܗܘܝܐ ܥܠܗ ܚܕ ܚܕ ܡܫܝܚܝܐ
ܡܫܝܚܝܐ ܕܦܝܫܬܐ ܕܥܠܡܐ. ܫܘܬܐ ܫܪܝܪܬܐ.

ܥܘܒܕܐ ܕܦܘܫܩܐ ܥܡܝܩܬܐ (ܚܟܡܬܐ)

١ . ܦܫܘܩ ܠܪܘܟܒܐ ܕܥܕܬܐ ܕܝܠܕܬܐ ܕܡܫܝܚܘܬܐ ؟

٢ . ܕܐܝܢ ܡܕܝܢܬܐ ܐܝܬ ܥܕܬܐ ܠܚܟܡܬܐ ؟

٣ . ܟܡܐ ܐܘܪܚܐ ܡܬܝܒܢܐ ܘܡܢܐ ܕܚܟܡܬܐ ܒܗ ܥܕܬܐ ܕܡܫܝܚܘܬܐ . ܘܡܢܐ ܒܠܗ ܡܝܬܐ ܕܟܘܢܫܗ . ܡܬܩܪܝܐ ܠܚܟܡܬܐ ܒܗ ܦܘܪܫܢܝܬܐ ܕܝܠܢܝܬܐ ؟

٤ . ܡܢܝ ܠܐܡܘܢܐ ܬܪܝܢ . ܐܝܟ ܕܡܬܚܙܝܢ ܥܠ ܐܪܥܐ ܕܟܢܘܫܝܐ ܥܘܡܩܐ ܘܦܬܝܐ . ܘܦܫܘܩ ܦܘܫܩܗ ܠܥܒܕܐ ܕܟܠ ܐܡܘܢܐ ܡܢܗܘܢ .

٥ . ܡܢܝܢ ܡܢܐ ܕܒܢܝܢܐ ܗܘܐ : ܡܬܚܙܝܢܘܬܐ ܡܫܝܚܘܬܢܝܬܐ . ܐܝܟܢܘܬܐ ܡܬܚܙܝܢܘܬܐ ܟܘܪܝܬܐ .

٦ . ܦܫܘܩ ܦܘܫܩܐ ܠܪܘܟܒܐ ܕܩܘܪܒܐ ܒܢܝܢܐ .

٧ . ܡܢܝܢ ܠܥܒܕܘܬܐ ܕܡܬܒܠܥܐ ܕܘܡܪܐ ܠܡܘܫܐ ܬܪܝܢ .

٨ . ܡܢܝ ܠܫܢܘܬܐ ܕܐܘܪܚܬܐ ܒܗ ܕܘܠܟܬܐ ܕܐܪܥܐ ܒܝܬ ܪܘܡܐ .

٩ . ܟܬܘܒ ܠܡܘܕܥܐ ܕܗܘܡܠܐ ܒܗ ܦܪܨܘܦܐ . ܘܡܢܝܢ ܠܗܘܠܝܢ .

١٠ . ܦܫܘܩ ܠܡܕܝܢܬܐ ܕܐܢܛܝܘܟܝܐ ܣܘܪܝܝܬܐ (ܟܢܘܫܝܬܐ) ܒܗ ܦܪܨܘܦܐ

١١ . ܦܫܘܩ ܟܡ ܐܘܪܚܐ ܒܢܝܢܐ ܠܟܠ ܡܢ ܡܠܟܘܬܐ ܘܐܘܪܚܐ .

١٢ . ܡܚܘܝ ܥܠܬܐ ܕܡܢܐ ܕܒܢܝܢܐ ܗܢܐ :

ܐ . ܠܗܘܬܐ ܕܐܘܪܚܐ ܒܢܝܢܐ ܡܬܚܙܝܢܐ ܒܗ ܕܘܡܪܐ .

ܒ . ܠܗܘܬܐ ܕܒܝܬܐ ܕܥܠܝܢܐ ܒܗ ܕܘܠܟܬܐ ܕܐܪܥܐ .

ܓ . ܡܬܚܙܝܢܬܐ ܕܦܘܪܫܐ ܕܚܟܡܬܐ ܥܠ ܐܬܠܝܐ ܡܠܟܘܬܢܝܬܐ . ܘܡܢܝܘܬܐ ܕܟܘܡܪܐ ܘܥܒܕܐ ܒܗ ܦܪܨܘܦܐ .

ܕ . ܗܘܝ ܦܘܪܫܐ ܕܚܟܡܬܐ ܒܗ ܐܪܥܐ ܟܕ ܐܬܐ ܟܝܠܘܬܐ ܘܕܝܠܢܝܘܬܐ ܡܢ ܐܕܘܟܝܗ ܒܗ ܡܠܟܘܬܐ .

١٣ . ܡܚܘܝ ܠܥܠܬܐ ܕܡܢܐ ܕܒܢܝܢܐ ܗܢܐ :

ܟܘܪܗܐ ܠܥܡܢܝܬܐ . ܘܡܫܝܚܐ ܒܢܝܢܐ . ܪܒܠܐ ܡܬܚܙܝܢܬܐ . ܡܬܚܙܝܢܐ ܒܢܝܢܐ ܗܘܐ ܢܬܚܙܐ . ܟܬܒܐ ܦܫܝܩܬܐ . ܡܬܚܙܝܐ ܕܪܚܝܩܐ .

١٤ . ܡܢܝܢ ܠܦܫܩܬܐ ܐܚܪܢܝܬܐ ܒܗܘܕܐ ܕܐܘܪܚܐ ܒܢܝܢܐ ܒܗ ܚܘܒܐ .

١٥ - ܦܫܘܩ ܠܐܢܫܘܬܐ ܕܒܘܪܐ ܠܗ ܦܠܓܘܬܐ ܢܕܘܡܐ .

١٦ - ܐܝܟܢ ܡܫܚܠܦܐ ܐܡܝܪܐ ܠܡܘܣܝܩܝܬܐ ܐܘܪܓܢܝܬܐ ܘܦܪܡܣܝܢܘܬ ܠܡܘܣܝܩܝܬܐ ܫܡܫܘܬܢܝܬܐ ؟

١٧ - ܡܢܐ ܐܝܬܘ ܗܝܟܐ ܒܕܝܠܐ ܠܢܒܝܐ ؟ ܡܢܝܢ ܠܐܒܝܢܘ .

١٨ - ܦܫܘܩ ܟܡ ܕܡܘܬܐ ܠܢܒܝܐ ܕܝܠܝܬܐ ܘܙܘܥܬܐ .

١٩ - ܐܝܟܢ ܗܕܐ ܕܡܘܬܐ ܠܢܒܝܐ ؟ ܕܗܘܐ ܚܕ ܐܫܟܚܬܐ ܡܢܘܕܐ ܠܥܘܢܝܘ

ܐ - ܚܠ ܐܕܝܫܘܬܐ ܕܕܝܠܐ ܠܢܒܝܐ .

ܒ - ܟܡ ܗܕܐ ܣܘܕܝܐ ܠܢܒܝܐ .

٢٠ - ܦܫܘܩ ܟܡ ܐܕܫܐ ܕܡܫܠܡܢܘܬܐ ܕܝܠܝܬܐ . ܟܡ ܡܢܝܢ ܠܐܕܫܐ ܕܡܫܠܡܢܘܬܐ ܐܘܪܓܢܝܬܐ .

٢١ - ܦܫܘܩ ܠܡܫܬܪܝܢܘܬܐ ܕܡܫܠܡܢܘܬܐ ܫܡܫܘܬܢܝܬܐ ܒܡܬܚܫܒܘܬܐ ܕܟܢܫܐ ܕܫܡܫܘܬܐ ܕܥܕܬܐ ܠܗ ܚܘܬܐ .

٢٢ - ܡܢܐ ܐܝܬܝܗ ܗܘܝܘ ܕܝܠܐ ܕܩܠܝܬܐ ܠܗ ܦܘܪܫܢܘܬܐ ؟ ܦܫܘܩ ܥܠܝܗܝܢ ܒܐܪܝܟܘܬܐ .

٢٣ - ܒܗܘܢ ܟܠܗ ܝܕܥܬܐ ܕܟܠ ܚܕ ܕܝܠܐ ܗܠܝܢ :

ܐ - ܩܘܕܫܐ ܕܩܠܝܬܐ .

ܒ - ܩܠܝܬܐ ܕܥܕܬܐ .

ܓ - ܩܘܣܬܐ .

٢٤ - ܦܫܘܩ ܒܐܪܝܟܘܬܐ ܠܡܢܝܢܐ ܕܐܕܫܐ ܘܦܘܠܚܢܗ ܠܗ ܥܕܬܐ .

٢٥ - ܡܢܝܢ ܠܫܡܗܐ ܡܢ "" ܙܘܕܝܬܐ ܐܚܪܝܬܐ "" .

٢٦ - ܦܫܘܩ ܠܡܢܝܢܐ ܐܝܟ ܕܡܬܘܕܥܐ ܥܠܘ ܦܝܫܝܢ ܚܕܬܐ ܠܗ ܥܕܬܐ ܥܡ ܡܢܝܢܐ ܕܝܕܥܬܐ ܕܟܠ ܚܕܐ .

ܠܡܘܕܥܬܐ :

ܐ) ܡܣܬܟܠ ܙܠܐ ܕܟܬܒܘܢ ܐܢܐ ܒܟܬܒܐ ܠܡܠܐ ܕܘܠܐ ، ܡܢܐ ܐܝܬܝܗ ܐܘܪܓܢܐ ܕܝܠܝܬܐ ܘܠܢܒܝܐ ܐܝܟ ܕܡܫܡܫ ܒܗܝܢ ܥܠܝܬܐ ؟ ܐܝܟܢ ܒܬܠܡܝܕܐ ܠܡܐ ܕܒܪܝܬܐ ܐܝܬܘ ܕܘܟܪ ܠܥܕܬܐ .

ܦܘܫܩܐ ܥܒܕܢܝܐ

ܡܥܒܕܢܘܬܐ ܕܗܘܪܡܘܢܐ

١ . ܪ̈ܝܫܐ ܬܘܢ̈ܝܐ

ܘܠܝܡ ܒܝܠܣ William Bayliss ܘܐܪܢܣܛ ܣܛܪܠܢܓ Ernest Starling ܗܠܝܢ ܝܕܘ̈ܥܐ ܒܪܝܛܢ̈ܝܐ ، ܗܘܘ ܩܕܡܝ̈ܐ ܕܐܫܟܚܘܗ̇ ܠܡܠܬܐ ܕܗܘܪܡܘܢ (Hormone) ܒܫܢܬܐ ١٩٠٢ . ܟܕ ܡܫܬܡܠܝܢ، ܐܝܟ ܡܫܘܕܥܘܬܐ ܠܡܪܩܘܢܐ (Secretin) ، ܘܗܘ ܝܠܗ ܚܕ ܡܠܘܐܐ ܒܡܥܝܢܐ ، ܕܦܩܐ ܠܗ ܐܫܝܬܐ ܕܡܥܝܐ ܡܥܝܢܐ . ܒܐܚܢܘܬܐ ܕܐܝܬܘܬܐ ܕܗܘܪܡܘܢܐ ܠܗܘܢ . ܒܬܪ ܗܕܐ ܡܠܝܐ ܗܘ ܡܣܒܘܪܐ ܕܡܢ ܠܦܝܫܐ ܕܠܗܡܐ . ܟܠܐ ܡܥܒܕܢܘܬܐ ܕܗܢ ܡܥܒܕܢܘܬܐ ܗܠ ܕܡܛܝܐ ܠܦܝܕܪܐ ، ܘܐܝܟ ܕܡܫܪܐ ܐܫܕܝܐ ܒܥܢܝܢܐ ܘܕܦܩܬܐ ܕܐܝܣܘܡܘ ܐܝܟ ܕܡܩܪܒ ܒܥܕܪܐ . ܟܡ ܚܘܠܛܢܘ، ܒܠܚܘܕ ܘܣܛܪܠܝܢܓ ܕܡܠܘܐܐ ܡܥܝܢܐ ܐܝܟ ܐܝܢܐ ܡܛܝܠܝ ܠܕܪܐ ܐܢܫܝܐ ܒܥܫܠܘܦܝܐ ܕܚܝܘܬܐ . ܘܡܫܘܪܝܢܠܗܘܢ، ܠܡܠܬܐ ܕܗܘܪܡܘܢ، ܡܢ ܡܠܬܐ ܝܘܢܝܬܐ ܐܘܪܡܘܢ (Ormon) ، ܕܫܘܕܥܗ ܝܠܗ ܡܥܝܪܢܝܬܐ . ܘܡܢ ܡܫܬܟܚܐ ܥܠ ܡܠܘܐܐ ܕܟܝܢ ܡܫܘܕܪܝܢ ܒܕܡܐ ܡܢ ܡܢܘܬܐ ܕܠܗܡܐ . ܘܦܪܫܝܢ ܠܗܘܢ ܕܡܥܝܪܝܢ ܡܕܡܝܐ ܒܫܘܠܛܢܐ ܒܚܘܪܬܐ ܐܘ ܒܣܘܪܐ . ܐܘ ܗܕܡܐ ܡܫܚܠܦܐ . ܐܠܐ ܝܠܗ ܡܫܚܠܦܬܐ ܐܝܬܘܬܐ ܕܗܘܪܡܘܢܐ ܥܠ ܚܝܘܬܐ . ܐܠܐ ܐܝܟ ܦܪܝܫܐ ܡܢܐ ܕܡܣܬܝܟ ܐܦ ܠܗ ܢܛܝܪܬܐ . ܘܕܪܫܘܗ̇، ܠܥܒܕܢܘܬܐ ܕܐܝܬܘܬܐ ܕܐܝܢܐ ܡܠܘܐܐ ܠܗ ܚܕܐ ܘܢܛܝܪܬܐ ܥܡܝܩܬܐ ܡܕܡܝܐ ܕܡܥܒܕܬܐ ، ܘܟܕ ܡܫܬܟܚܠܗܘܢ، ܐܬܘܢܚܘ ܠܫܪܠܣ ܕܪܘܝܢ، (Charles Darwin) ܘܦܪܢܣܝܣ ܕܪܘܝܢ، (Francis Darwin) ܒܫܢܬܐ ١٨٨٠ ܒܡܕܒܪܢܘܬܐ ܕܥܘܬܪܐ ܠܡܪܢܝܬܐ ܕܨܡܚܐ . ܟܕ ܚܙܐܠܗܘܢ، ܒܡܕܒܪܢܘܬܐ ܕܥܘܬܪܐ ܠܬܢܝܬܐ ܡܢ ܡܕܝܢܬܐ ܕܦܪܕܬܐ ܕܫܪܟܐ ، ܕܟܠ ܒܡܕܒܪܢܘܬܐ ܕܥܠܝܬܐ ܕܨܒܘܪܐ ܥܠܗ ܡܢ ܚܕ ܡܢ ܓܢܒܐ ܠܐܝܟ ܙܘܥ ܢܘܗܪܐ ، ܐܠܐ ܗܘ ܐܝܟ ܕܒܗ ܡܫܘܕܥܐ ܒܚܕ ܚܘܠܐ ܫܪܝܪܐ . ܘܡܫܬܟܚܠܗܘܢ، ܠܥܘܠܐ ܕܐܝܢ ܡܠܘܐܐ ܡܥܒܕܢܐ ܡܢ ܪܝܫܐ ܠܥܩܪܐ ܕܨܒܘܬܐ ܒܫܘܪܝܗ . ܘܐܘܗ

ܗܘܳܐ ܥܘܳܕܳܢܳܐ ܠܰܕܒܳܪܘܬܳܐ ܥܰܡܡܳܝܬܳܐ ܒܚܰܕ ܡܰܕܒܪܳܢܘܬܳܐ ܗܰܦܟܳܢܳܝܬܳܐ ܠܗ ܫܢܺܝܢ، ܟܕ ܐܰܝܟ ܠܡܰܟܬܒܳܢܘܬܗ ܒܬܰܪ ܐܶܣܳܪܳܐ ܦܫܘܛܳܐ.

٢ - ܦܘܠܚܳܢܳܐ ܗܰܦܟܳܢܳܝܳܐ ܠܘܳܬ ܡܰܢܟܝܳܢܶܐ (ܐܘܡܢܳܝܳܐ ܘܗܰܦܟܳܢܳܝܳܐ):

[illegible]

[illegible]

[illegible]

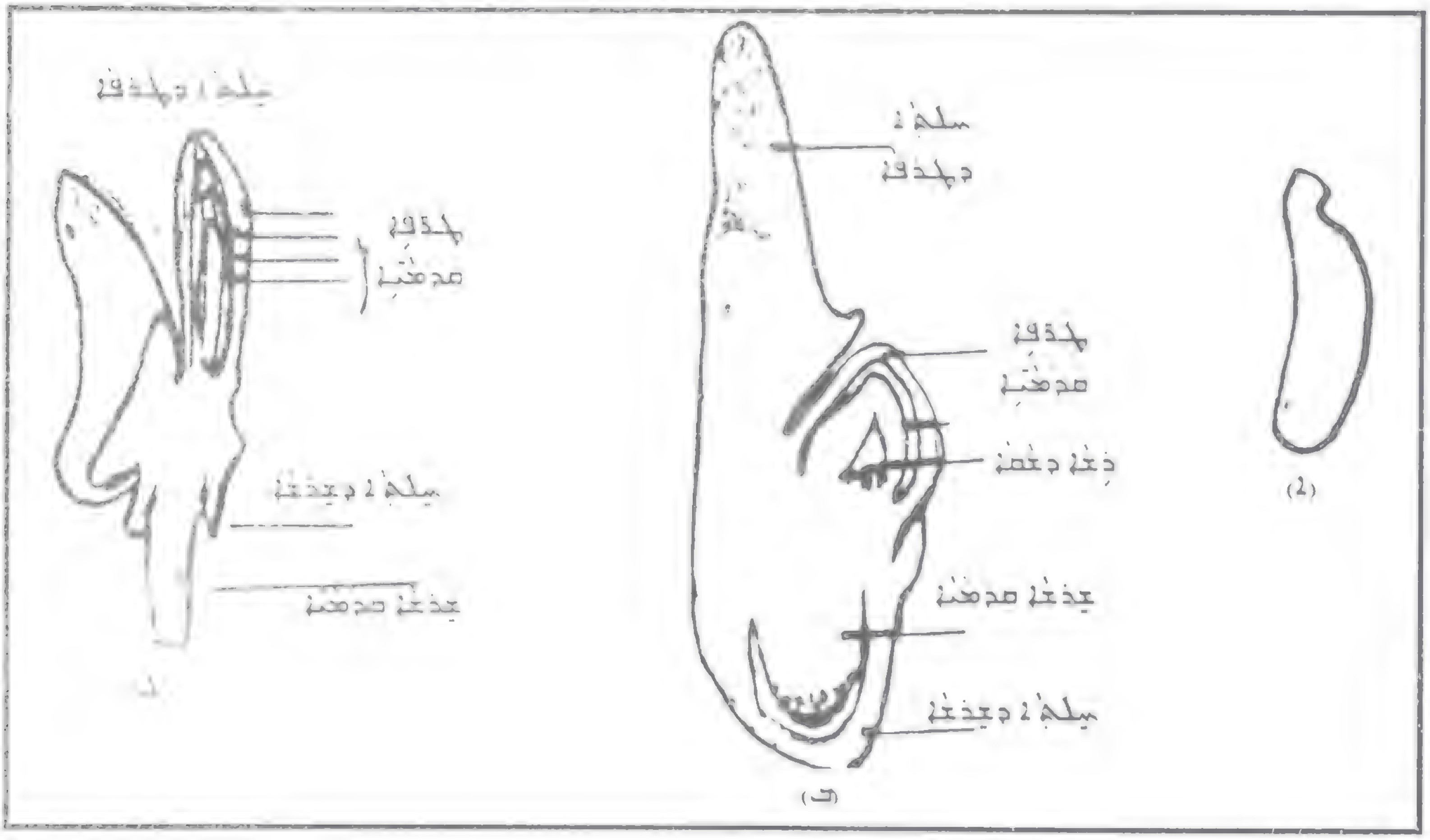
ܐܦ ܠܐ ܗܘܐ ܥܠܝܗ . ܘܒܬܪ ܡܢܣܬܐ ܕܗܘܪܡܘܢܐ ܢܨܒܝܬܐ ܡܢ ܩܕܡ ܡܣܢܝܬܐ ܡܘܠܕܢܝܬܐ ܐܚܪܢܝܬܐ .

٢ — ١ ـ ܐܘܟܣܝܢܐ ܘܗܘܪܡܘܢܐ :

ܦܝܫܐ ܗܠܝܢ ܡܘܬܒܐ ܥܡܐ ܕܗܘܪܡܘܢܐ ܢܨܒܝܬܐ (Phythohormones) ܥܠ ܡܠܘܐܐ ܗܕܡܝܐ (ܠܐ ܗܘܪܡܘܢܝܐ) ܡܬܘܪܝܐ ܡܢܝܢܢ ܠܗ ܠܘܩܒܐ ܕܢܨܒܬܐ ، ܘܐܝܬ ܕܡܩܡܝ ܒܡܫܚܠܦܘܬܐ ܕܪܒܝܐ ܡܢ ܦܠܓܐ ܐܚܪܢܐ ܠܗ ܢܨܒܬܐ . ܘܥܠ ܕܐܗܐ ܣܘܥܪܢܐ ܗܢܐ ܗܘܪܡܘܢܐ ܢܨܒܝܬܐ ܡܫܚܠܦܢܝܬܐ ܠܦܠܚܘܬܐ . ܦܝܫܝ ܡܬܦܪܫܝܢ ܒܫܠܡܐ ܒܨܘܪܬܐ ܟܝܡ ܘܡܘܪܐ ܡܬܪܥܝܢܐ ܪܒܝܐ ܠܗ ܢܨܒܬܐ . ܐܝܟ ܪܝܫܐ ܪܒܝܐ ܕܥܩܪܐ ܘܫܠܡܘܬܐ ܠܦܪܩܬܐ ، ܘܝܪܩܐ ܘܦܠܛܐ ܘܦܐܪܐ ܘܐܪܒܥܗ . ܘܣܘܥܪܢܐ ܗܢܐ ܐܘܟܣܝܢܐ ܗܘܪܡܘܢܐ ܢܨܒܝܬܐ ܡܬܬܥܝܪܝܢ ܠܡܫܚܠܦܘܬܐ ܕܪܒܝܬܐ ܚܠܝܦܐ . ܘܥܠܝܗ ܗܘܪܡܘܢܐ ܢܨܒܝܬܐ ܡܕܡܝܐ ܥܒܝܕܐ ، ܘܐܝܬ ܡܬܝܕܥܝܢ ܫܘܡܗܐ ܟܕ ܠܦܘܬ ܡܢ ܒܣܬܪ ܘܕܘܟܝܬܐ . ܘܡܢ ܡܕܡܝܐ ܦܠܝܓܐ ܒܐܘܪܚܐ ܠܒܝܠܐ ، ܡܠܦܢܐ ܣܟܣ (Sachs) ، ܒܦܠܓܐ ܐܚܪܢܐ ܡܢ ܕܪܐ ܕܬܫܥܣܪ ، ܟܕ ܚܙܝܗ ܒܗܝ ܕܐܝܬ ، ܐܝܬܘܗܝ ܕܡܠܘܐܐ ܕܒܢܝܐ ، ܦܝܫܝ ܡܬܘܪܝܐ ܠܗ ܠܦܪܩܐ ، ܘܡܫܢܝܢ ܠܗ ܠܘܩܒܐ ܕܢܨܒܬܐ ، ܘܦܠܓܝ ܠܡܫܚܠܦܘܬܐ ܕܪܒܝܬܐ . ܘܒܫܢܬܐ ܕ ١٩٢٦ ܡܬܐܠܗܘܢ ܒܪܘܫܐ ܡܢ ܐܝܟ ܐܘܟܣܝܢܐ ܐܝܬ ܕܦܪܣܘܗܝ ܥܡܠܐ ܡܢ ܢܨܒܬܐ ، ܘܦܪܣܘܗ ܡܫܘܕܥܐ ܥܠ ܪܘܚܒܗ ، ܗܠܝܢ ܐܘܟܣܝܢ ܡܫܘܡܗܐ ܐܝܕܘܠ ܚܡܘܨܐ ܕܐܣܝܛܝܟ (Indole a cetic acid) ܘܡܬܩܪܝܐ IAA . ܘܟܕ ܡܫܘܚܬܐ ܒܦܘܫܐ ܠܐܗܐ ܪܘܟܒܐ ܠܗ ܢܨܒܬܐ ، ܠܐ ܗܘܐ ܡܬܚܫܒܬܐ ܕܒܝܬܐ ܕܟܝܡܝܐܝܬ ܗܘ ܒܐܘܪܚܐ ܒܝܢܝܬܐ ܚܕܢܝܬܐ . ܘܫܘܪܬܐ ܗܘܐܠܗܘܢ ܒܙܘܥܐ ܐܘܪܚܐ ܫܒܝܩܬܐ ܠܡܬܠܡܘܬܐ ܗܘܐ ܟܝܢܘܬܐ ܗܘܪܡܘܢܝܬܐ . ܒܐܘܪܚܐ ܕܡܢܐ ܕܡܬܡܘܗܐ ܗܠܝܢ ܒܢܘܣܝܐ ܚܝܘܬܢܝܐ (Bioassay) ، ܒܣܘܡܟܐ ܕܡܬܢܝܢܘܬܐ ܕܡܘܪܐ ܢܨܒܬܢܝܐ ܚܕܐ ܕܗܘܪܡܘܢܐ . ܘܟܕ ܪܒܐ ܕܢܘܣܝܐ ܚܝܘܬܢܝܐ ܘܡܬܚܙܝܐ ܗܠܝܢ ܢܘܣܝܐ ܚܝܘܬܢܝܐ ܒܕܘܟܬܐ ܒܢܘܣܝܐ ܕܥܘܦ . ܘܐܘܪܚܐ ܕܢܘܣܝܐ ܚܝܘܬܢܝܐ ܡܬܦܠܓܬܐ ܥܠ ܬܪܝܢ ܪܘܚܝܐ ، ܒܫܘܬܦܘܬܐ ܠܐܝܕܘܠ ܚܡܘܨܐ ܕܐܣܝܛܝܟ IAA ܡܫܬܪܝܗ ܡܢ ܡܠܘܐܐ ܡܕܡܝܐ ، ܒܡܦܠܓܬܐ ܕܪܒܝܬܐ

ܕܙܪܥܐ (ܨܘܪܬܐ ٧ - ١) ، ܘܟܕ ܦܝܫ ܡܬܦܩܕܐ ܒܪܛܝܒܘܬܐ ܝܘܡܬܐ ܬܪܝܢ ܚܠܦܝܗ
ܠܗ ܚܕ ܡܗܠܟܢܐ ܘܬܘܒ ܡܬܦܩܕܐ ܡܢ ܐܓܪ (Agar) ، ܒܡܗܠܟܢܘܬܐ ܕܐܪܥܐ
ܕܝܠܗܿ ܕܦܪܘܝܬܐ ܠܥܝܢܐ ܒܥܝܢܐ ܕܐܪܥܐ ܕܡܬܝܕܥܐ ܕܐܘܟܣܝܢ ܠܘܬܗ ،
ܘܡܬܚܙܐ ܥܠ ܡܗܠܟܢܐ ܕܐܓܪ ، ܘܡܬܚܙܐ ܐܘܟܣܝܢ ܒܐܘܪܚܐ ܕܦܪܘܫܘܬܐ ، ܡܢ
ܪܝܫܐ ܕܝܠܗܿ ܠܡܗܠܟܢܐ ܕܐܓܪ .

ܘܡܢ ܗܪܟܐ ، ܦܝܫ ܡܬܩܪܝܢ ܡܗܠܟܢܐ ܕܐܓܪ ܐܢܘܢ ، ܥܠ ܚܕ ܓܒܐ ܡܢ
ܚܪܬܐ ܕܝܠܗܿ ܡܗܠܟܢܐ ܪܝܫܗ ܠܥܠܬܐ ܕܙܪܥܐ . ܘܡܬܚܙܐ ܡܠܘܐܐ ܕܐܪܥܐ (
ܐܘܟܣܝܢ) ܠܓܒܗ ܡܢ ܠܗ ܘܡܘܬܐ . ܐܝܟ ܕܡܥܠܝܢ ܡܫܬܢܝܢ ܒܡܢܘܬ
ܡܗܠܟܢܐ ܕܐܓܪ ، ܘܡܬܝܪܒ ܠܚܘܕܝܗ ܕܐܗܘ ܦܝܫܐ ܠܡܬܡܫܘܬܐ . ܘܡܬܪܒܝܢ
ܠܥܝܢܐ ܕܝܠܗܿ . ܘܗܘܐ ܐܗܘ ܕܪܒܝܢ ܕܠܥܝܢܐ ܡܘܬܚܝܢ ܠܡܬܡܪܘܬܐ
ܕܗܘܪܡܘܢܐ ، ܟܕ ܠܡܬܚܐ ܡܬܚܫܒܐ ܕܘܡܘܬܐ ܗܢܐ ܠܡܠܦܐ ܕܦܪܘܝܬܐ (
ܝܠܕܐ) ܡܢ ܠܡܬܚܙܝܘܬܐ ܕܗܠܟܬܐ . ܥܠ ܒܡܬܝܘܬܐ ܕܗܘܪܡܘܢܐ ܕܐܝܟ ܠܗ
ܡܗܠܟܢܐ ܕܐܓܪ .



ܨܘܪܬܐ (٧ - ١) ܦܬܝܚܬܐ ܕܙܪܥܐ ܐ . ܡܗܠܟܢܐ ܐܪܝܟܘܬܢܝܐ ܠܗ ܦܪܘܬܐ
ܒ . . ܡܗܠܟܢܐ ܐܪܝܟܘܬܢܝܐ ܠܡܬܘܠܕܐ . ܓ . . ܡܗܠܟܢܐ ܐܪܝܟܘܬܢܝܐ ܠܗ
ܥܠܬܐ ܥܒܪܐ .

ܒܪܡܫܐ ܗܢܐ ܒܡܙܪܥܐ ܠܡܙܪܥܬܐ ܕܡܬܪܓܬܐ ܕܐܘܟܣܝܢܐ ܡܫܬܡܫ . ܐܝܟ
ܕܒܐܡܬܚܡܐ ܕܐܘܟܣܝܢ ܡܬܘܡܝܐ ܒܡܬܚܡܢܐ ܕܐܝܠܢܐ ܘܕܝܠܢܐ ܒ (D ـ ٢،٤
) ، ܘܗܘ ܝܠܗ ܐܘܟܣܝܢܐ ܕܟܝܡܝܐ ܡܘܦܩܢܐ ܡܢ ܒܪܢܫܐ ܠܥܠܝܐ ܘܢܟܣܐ ، ܐܝ̈ ܟܝܡܝ
ܡܘܦܩܢܐ ܒܥܒܘܕܘܬܐ ܝܠܢܬܐ .

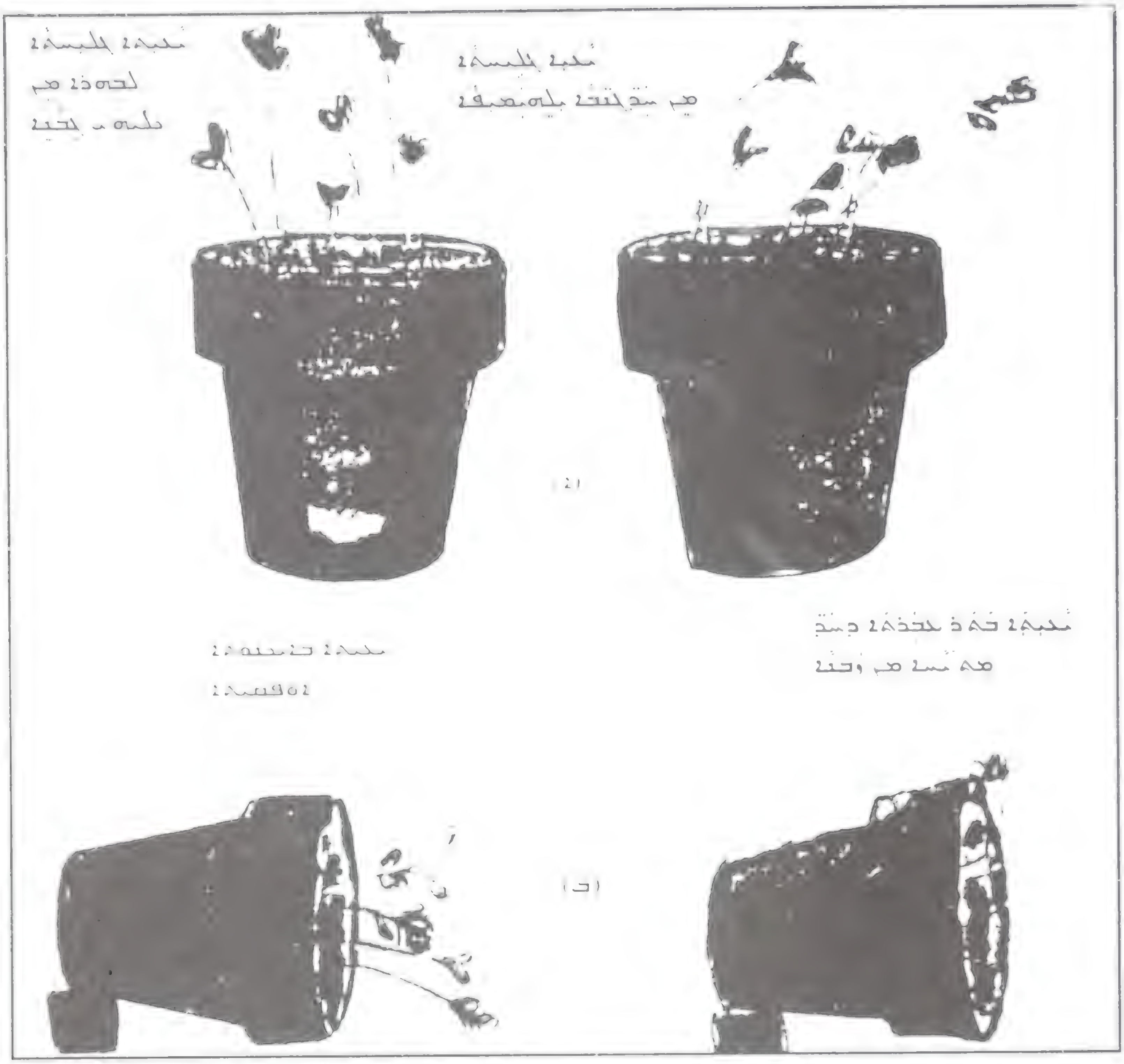
٢ ـ ٢ ـ ܡܥܒܕܢܘܬܐ ܕܐܘܟܣܝܢܐ :

ܐܝܬ ܐܘܟܣܝܢܐ ܒܡܫܚܠܦܢܘܬܐ ܕܡܝܬܝܐ ܡܢ ܦܘܪܫܘܬܐ ܕܪܒܝܬܐ
ܘܡܫܚܠܬܐ ܠܗ ܢܝܢܐ ، ܘܡܢ ܐܢܝ ܦܘܪܫܘܬܐ ܒܝ ܐܝܢܫܐ ܝܠܗ :

٢ ـ ٢ ـ ١ ـ ܡܥܒܕܢܘܬܐ ܕܐܘܟܣܝܢܐ ܒܪܒܝܬܐ ܕܫܪܫܐ ܪܒܝܐ ܘܐܘܪܟܘܬܐ ܕܙܘܢܩܐ ܠܢܘܗܪܐ :

ܐܢܐܠܗܘܢ ܪܒܘܬܐ ܕܒܝܠܗܝ ܒܝܕ ܙܘܥܐ ܕܐܢܫܐ ܒܢܘܗܪܐ ، ܡܢ ܕܪܫܐ
ܕܦܘܩܐ ܕܫܠܬܐ ܐܝܟܕܝܬܐ (Coleoptile) ܠܢܝܫܐ ܕܒܝܫܐ ، ܒܝܕ ܢܝܢܐ
ܕܥܠܡܐ ܠܡܫܘܕܥܘܬܐ ܐܢܬܢܝܬܐ ، ܘܢܦܢܐ ܐܢܝܐ ܒܢܘܗܪܐ . ܒܝܕ ܢܝܢܐ
ܕܥܠܡܐ ܕܪܝܐ ܒܡܠܘܐܐ ܒܠܫܢ ܠܡܫܘܕܥܘܬܐ ܐܢܬܢܝܬܐ . ܐܝܟ ܟܝܢܐ
ܕܦܢܐ ܐܠܗ ܡܗܝܡܢܘܬܐ ܕܫܘܪܬܐ ܡܪܦܝܐ ܠܐܘܪܐ ܐܢܝܬܐ ، ܐܝܟ ܝܠܗ
ܕܣܡܝܘܬܐ ܣܓܝܐ ، ܗܝܟ ܕܪܝܐ ܒܡܠܘܐܐ .

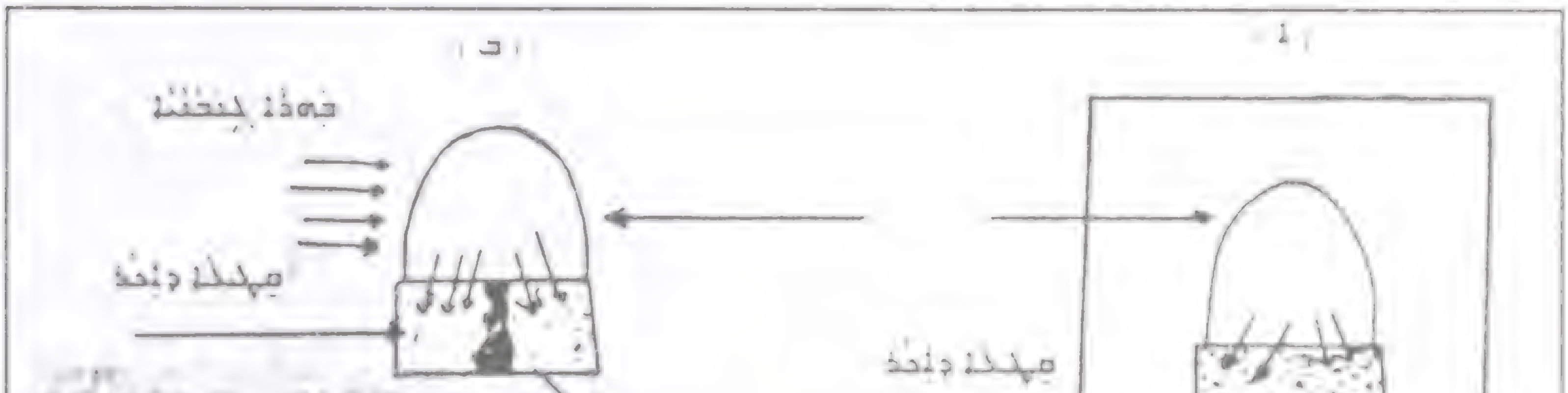
ܘܐܝ̈ ܟܝܡܝܐ ܡܘܦܩܢܐ ܕܪܝܐ ܕܫܠܬܐ ܐܝܟܕܝܬܐ . ܒܝܕ ܒܥܢܐ ܡܢ ܥܠܘܐܐ
ܘܡܥܠܐ ܒܚܪܬܐ ܕܒܘܪܐ ، ܦܬܚ ܗܘܐ ܦܬܐ ܡܢܘܪܝܬܐ ܫܠܬܐ ܥܠܗ
ܡܫܘܕܥܘܬܐ ܐܢܬܢܝܬܐ . ܠܐ ܦܬܐ ܣܘܝܬܐ ܗܝ ܐܢܝܬܐ ، ܘܗܕܝܐ ܐܝ̈
ܟܝܡܝܗܝ ܡܫܘܫܝܐ ܕܪܝܐ ܕܫܠܬܐ ܐܝܟܕܝܬܐ . ܒܗܘܢܗܘܢ ܒܒܘܪܐ
ܐܢܬܢܝܐ ، ܗܘܐ ܡܠܝܬܐ ܐܘ ܠܝܬܐ . ܘܟܕܒܝܬܐ ܥܠܗ ܒܥܒܘܕܬܐ
ܕܗܕܝܐ ܢܝܢܐ ܡܢ ܥܠܡܐ ܒܒܘܪܐ ، ܒܥܘܠܡܐ ܕܐܝܟ ܗܕܝܐ ܐܝܟ
ܒܘܕܬܐ ܐܘܟܣܝܢܐ ، ܗܢܐ ܡܫܘܫ ܗܘܐ ܐܟܝܢܐ ܡܢ ܢܝܢܐ ، ܗܘ ܥܠܝ
ܐܢܝܬܐ ܒܢܘܗܪܐ ܡܫܚܠܦܬܐ (ܗܢܐ ܘܡܢ ܐܢܝ ܙܘܥ ܡܢܘܗܪܐ ܕܒܘܪܐ) .
ܐܝܟ ܒܪܝܐ ܘܡܫܘܫ ܐܪܟܝܐ ܐܡܪܝܢܐ ، ܗܘ ܥܠܝ ܐܢܝܬܐ ܒܢܘܗܪܐ
ܡܪܚܩܬܐ ، ܗܢܐ ܘܡܢ ܐܢܝ ܕܣܡܠܐ ܡܢ ܡܢܘܗܪܐ ܕܒܘܪܐ (ܐܣܟܡܐ ٧ ـ
٢) .



ܨܘܪܬܐ (٧ - ٢) ܡܢܘܬܐ ܐ - ܓܢܝܬܐ ܢܘܗܪܬܐ ܒ - ܓܢܝܬܐ ܐܪܥܢܝܬܐ

ܘܐܝܬܠܗܘܢ ܣܘܥܪܐ ܝܬܝܪܐ ܡܢ ܐܘܟܣܝܢ ܠܦܢܝܬܐ ܕܓܪܒܐ ܕܐܘܟܣܝܢ ܒܙܘܐ ܡܢܝܬܐ ، ܘܡܢ ܐܝܟ ܗܢܐ ܐܬܝܠܕܬ ܐܘܟܣܝܢ ܕܡܬܠܦܬܝܢ ܘܣܝܡ (Cholodny _ Went theory) ܗܝ ܕܡܬܝܒܢܐ ܕܓܘܪܐ ܓܢܝܢܐ ܡܕܒܪܐ ܫܘܪܝܐ ܕܐܘܟܣܝܢ ܓܢܝܢܝܬܐ ، ܗܢܐ ܘܒܗ ܡܢ ܓܢܐ ܡܬܘܠܕܢܐ ܠܓܢܒܐ ܕܢܣܒܐ ܡܢ ܢܘܗܪܐ ، ܘܠܗ ܦܢܝܬܐ ܕܡܬܛܫܝܢܝܬܐ ܠܢܘܗܪܐ ܡܢ ܣܛܪܐ ܓܪܒܝܬܐ (ܗܢܐ ܘܒܗ ܕܬܐ ܫܘܠܛܢܐ) ܡܬܬܘܒܐ ܘܢܦܠܐ ܕܡܫܘܚܬܐ ܕܐܘܟܣܝܢ ܒܓܢܒܐ ܕܢܣܒܐ ܡܢ ܢܘܗܪܐ ܝܬܝܪ ܒܓܢܒܐ ܡܬܘܠܕܢܐ . ܘܫܪܟܐ ܫܘܪܝܐ ܕܐܘܟܣܝܢ ܡܢ ܕܬܐ

ܠܦܝܫܬܐ ܕܡܬܚܫܒܬܐ . ܡܫܪܝܐ ܡܬܚܪܝܢܘܬܐ ܕܐܘܟܣܓܝܢ ܥܡ ܘܗܕܬܐ
ܕܡܫܚܬܐ ܕܡܬܚܫܒܬܐ ܕܚܘܪܬܐ ܕܓܢܒܪܐ ܪܝܫܢܐ ܡܢ ܟܘܪܐ . ܦܫܝܫܘܬܐ
ܒܓܢܒܐ ܒܪܡܘܒܠܐ ܠܟܘܪܐ . ܘܡܘܕܥܐ ܓܢܒܐ ܚܠܬܐ ܐܘ ܬܠܬܐ ܝܘܡܐ ܟܘܪܐ ܡܢ
ܦܠܛܐ ܕܠܐ ܗܘܡܠܐ ܕܪܟܝܟܬܐ ܒܗܪܘܡܐ ܓܢܒܪܐ . ܘܡܫܘܚܬܐ ܕܝܠܗܘܢ
ܕܪܝܫܘܬܐ ܠܗܪܝܓܘܬܐ ܕܐܝܬ ܗܐܘܪܐ . ܟܕ ܦܝܫܠܗ ܥܒܝܠܬܐ ܦܫܝܫܘܬܐ
ܕܐܘܟܣܓܝܢ ܕܐܝܬ ܒܪܟܐ ܕܚܠܬܐ ܒܡܬܚܠܬܘܬܐ ܕܨܝܕܐ ܡܢ ܠܚܡܐ . ܒܝܕ
ܡܬܓܕܐ ܕܨܝܕܐ ܕܠܚܡܐ ܚܕ ܗܘܝܐ ܓܢܒܐ ܡܬܘܪܝܬܐ ܘܐܚܪܝܢܐ ܗܘܝܐ
ܓܢܒܐ ܪܝܫܢܐ ܡܢ ܟܘܪܐ . ܟܕ ܦܪܫ ܐܘܟܣܓܝܢ ܠܨܝܕܐ ܕܠܚܡܐ ܐܝܬܐ ܡܢ ܪܟܟܐ .
ܒ ܦܝܫܠܗ ܡܬܡܨܝܬܐ ܦܫܝܫܘܬܐ ܕܐܘܟܣܓܝܢ ܒܨܝܕܐ ܕܠܚܡܐ . ܐܝܟܐ ܒܐܘܪܚܐ
« ܢܘܦܩܐ ܕܚܠܬܐ ܕܟܘܦܐ » ܗܘ ܕܦܝܫܠܗ ܡܬܘܟܕܢܬܐ ܡܢ ܡܕܝܢ .
ܘܡܬܒܝܠܗ ܕܦܫܝܫܘܬܐ ܕܐܘܟܣܓܝܢ ܡܬܦܠܛܬܐ ܡܢ ܓܢܒܪܐ ܪܝܫܢܐ .
ܡܬܡܨܝܬܐ ܠܗ ܒܝܦܐ ܕܦܫܝܫܘܬܐ ܡܬܦܠܛܬܐ ܡܢ ܓܢܒܪܐ ܕܪܡܘܒܠܐ (
ܨܘܪܬܐ ٧ - ٣) . ܐܝܟܐ ܝ. ܦܝܫܠܗ ܡܬܦܠܛܐ ܪܟܟܐ ܕܚܠܬܐ ܐܪܝܓܘܬܢܝܬܐ .
ܒܡܬܚܠܬܘܬܐ ܕܚܕܐ ܙܦܝܬܐ ܘܓܘ ܓܒܐ ܢܝܬܐ ܪܝܫܬܐ ܐܘ ܙܦܝܬܐ ܕܡܫܚܐ
ܘܦܝܫܠܗ ܡܬܘܪܝܬܐ ܪܟܟܐ ܡܢ ܚܕ ܓܢܒܪܐ ܒܠܚܘܕ . ܠܐ ܦܝܫܠܗ ܚܘܝܐ ܗܘ
ܦܘܪܫܢܐ ܒܡܨܝܘܬܐ ܕܐܘܟܣܓܝܢ ܦܪܝܫܐ ܡܢ ܪܟܟܐ ܠܨܝܕܐ ܕܠܚܡܐ ܡܢ ܒܪܘܡܐ
ܓܢܒܪܐ . ܡܬܘܝܐ ܠܗ ܡܢ ܐܝܟܐ ܢܘܦܩܐ ܕܐܘܟܣܓܝܢ ܡܬܝܒ ܠܓܢܒܪܐ ܚܡܪܐ ܒܕ
ܒܪܫܐ ܡܢ ܓܢܒܪܐ ܡܬܘܪܝܬܐ . ܘܗܢܐ ܕܪܫܡ ܡܢ ܡܬܚܪܝܢܘܬܐ ܕܐܘܟܣܓܝܢ
ܒܪܟܐ ܕܚܠܬܐ ܨܪܦܢܝܬܐ . ܪܫܡ ܐܦ ܥܠ ܪܟܐ ܕܝܘܡܐ . ܐܝܟܐ ܪܟܐ ܕܪܥܪܟܐ .
ܐܝܢ ܝܠܗ ܡܪܝܫܢܐ ܒܓܢܒܬܐ ܟܘܪܬܐ . ܗܢܐ ܘܟܢ ܪܟܝܒ ܪܝܫܢܝܬܐ ܡܢ



ܨܘܪܬܐ (٧ — ٣)

ܫܢܬܐ. ܡܛܠ ܡܬܚܘܝܬܐ ܕܐܘܟܣܝܢ ܐܝܟ ܕܡܕܒܪܝܢ ܠܡܕܒܪܢܘܬܐ ܕܪܒܝܬܐ ܘܡܬܚܣܢܘܬܐ ܕܫܘܪܝܬܐ ܕܥܩܪܐ. ܡܕܒܪ ܡܫܠܛܐ ܕܡܬܚܣܢܘܬܐ ܕܫܘܪܝܬܐ ܕܪܒܝܬܐ. ܘܡܬܚܘܝܬܐ ܒܦܩܬܐ ܡܢ ܐܘܟܣܝܢ ܘܡܬܚܣܢܬܐ ܠܪܒܝܬܐ ܘܡܬܚܣܢܘܬܐ ܕܫܘܪܝܬܐ ܕܪܒܝܬܐ. ܠܗܠܝܢ، ܗܢ ܡܕܒܪܢܘܬܐ ܟܠ ܡܬܚܣܢܘܬܐ ܕܫܘܪܝܬܐ ܕܥܩܪܐ.

٢. ٢. ٢ ـــ ܡܕܒܪܢܘܬܐ ܕܐܘܟܣܝܢ ܒܡܬܒܢܝܢܘܬܐ ܘܪܒܝܢܘܬܐ:

ܒܕܒܬܐ ܗܠܝܢ ܕܐܬܚܘܬܐ ܕܩܠܡܐ ܟܠ ܩܠܡܐ ܡܬܦܠܓܐ ܒܡܬܕܝܪܬܐ ܕܥܩܪܐ ܒܥܩܪܐ ܕܝܬܝܪܬܐ ܕܦܘܡܐ ܚܡܫܐ ܠܐܝܬ ܩܠܡܐ ܠܗ ܟܘܦܐ. ܘܦܠܦܘܠܬܐ ܕܡܬܕܝܪܬܐ ܕܥܩܪܐ ܒܐܬܚܝܢܘܬܐ ܕܐܬܚܘܬܐ ܕܩܠܡܐ ܒܥܒܕܐ. ܗܘܝ ܒܪ ܒܥܒܕܐ ܡܢܗܘܢ ܒܐܬܚܝܢܘܬܐ ܕܐܬܚܘܬܐ ܕܩܠܡܐ ܒܡܥܒܕܐ. ܘܐܝܟܢܐ ܒܥܒܕܘܬܗܘܢ ܢܗܘܐ ܐܝܟ ܕܗܘܝ ܐܦ ܦܪܘܩܐ ܡܬܥܒܕܢܐ.

ܡܢ ܗܘ ܡܬܚܘܝܢܐ ܗܠܝܢ ܕܐܘܟܣܝܢܐ ܦܪܝܫܐ ܡܬܚܘܪܬܐ ܠܗ ܐܝܟ ܩܠܡܐ ܐܘ ܦܪܘܩܐ ܡܬܥܒܕܢܐ. ܘܡܥܒܕ ܠܦܘܠܓ ܚܕܐ ܡܢ ܩܠܡܐ. ܘܡܦܠܓܝܢ ܒܡܬܕܝܪܬܐ ܕܫܘܪܝܐ ܕܥܩܪܐ (Root Primordia). ܘܡܬܒܝܠܗ ܕܐܘܟܣܝܢ ܐܝܢܕܘܠ ܣܡܘܩܐ ܕܐܣܝܕ. ܗܠܝܢ ܚܕ ܡܢ ܗܘܪܡܘܢܐ ܚܝܢܐ ܡܬܥܒܕܢܐ ܠܡܬܕܝܪܬܐ ܕܥܩܪܐ. ܘܒܝܬܝܐ ܕܡܦܠܓܬܐ ܕܡܬܚܘܝܬܐ ܚܝܘܬܐ ܡܢ ܐܝܢܕܘܠ ܣܡܘܩܐ ܕܐܣܝܕ (IAA) ܡܦܠܓܝܢ ܒܘܪܟܬܐ ܕܡܢܝܢܐ ܕܥܩܪܐ ܝܬܝܪܐ.

ܘܒܬܘܩܦܬܐ ܕܐܘܟܣܝܢ ܠܚܕܬܐ ܡܚܝܠܬܐ ܕܥܡܐ ܡܬܥܒܕܢܐ. ܡܕܒܪܐ ܠܒܘܪܟܐ ܕܡܝܬܪܐ ܕܪܒܝܘܬܐ. ܘܐܝܕܐ ܕܡܢܝܢܐ ܕܥܩܪܐ ܡܬܚܘܪܐ. ܘܦܪܩܠܗ ܒܡܫܝܠܬܐ ܐܘ ܐܦ ܡܕܝܢܬܐ ܐܘܟܣܝܢܝܬ ܠܡܦܩܢܬܐ ܕܚܕ ܡܢܝܢܐ ܡܢ ܬܠܬܐ ܐܝܬܘܬܝܬܐ ܒܐܘܪܚܐ ܕܩܠܡܐ. ܗܕܐ ܡܕܒܪܢܘܬܐ ܕܟܠ ܩܠܡܐ ܒܐܘܟܣܝܢ.

٢ . ٢ . ٣ ـــ ܡܫܚܠܦܢܘܬܐ ܕܦܘܪܡܩܢܐ ܒܦܠܚܘܬܐ ܕܡܛܝܘܬܐ ܕܦܐܪ̈ܐ :

ܡܫܚܠܦܘܬܐ ܕܡܛܝܘܬܐ ܕܦܐܪ̈ܐ ܠܐ ܗܘܝܐ ܒܕܘܪܟܝܬܐ . ܐܠܐ ܡܢ ܡܫܚܠܦܘܬܐ ܫܘܠܛܢܝܬܐ ܐܢܫܝܬܐ . ܡܛܠ ܦܐܪ̈ܐ ܚܕܟܡܐ ܦܪ̈ܕܐ ܝܢܫܝܐ ܐܢܫܝܐ ܠܡܫܚܠܦܘܬܐ ܕܦܪܢܣܘܬܐ ܝܢܫܝܬܐ . ܘܟܕ ܦܐܪ̈ܐ ܡܢ ܦܠܛܐ ܦܐܪ̈ܢܐ ، ܡܢ ܦܠܚܐ ܕܐܡܝܢܘܬܐ ܕܦܠܚܢܘܬܐ ܕܚܘܕܬܐ ܡܬܕܟܝܢܬܐ ܕܢܕܡܣܘܬܐ ܕܟܝܢܐ ، ܐܝܟ ܕܗܘܝܐ ܡܬܚܙܝܐ ܦܠܛܐ ܡܬܦܪܢܣܐ ܕܦܐܪ̈ܐ ، ܘܟܕ ܗܘܐ ܦܠܛܐ ܡܬܦܪܢܣܐ ܕܦܐܪ̈ܐ . ܘܡܫܘܚܠܦܐ ܕܡܬܕܟܝܢܬܐ ܢܕܡܣܢܬܐ (ܡܬܗܦܟܢܝܬܐ) ܠܡܬܗܦܟܢܝܬܐ ܦܪܢܣܘܬܢܝܬܐ . ܟܕ ܡܢ ܦܠܚܐ ܕܡܫܚܠܦܢܘܬܐ ܡܬܕܘܟܢܝܬܐ ܒܝܢ ܕܘܟܬܐ ܡܘܕܥܢܐ ܕܟܝܢܐ . ܘܒܝܢ ܢܗܘܪܐ ܒܪܝܐ ܕܐܝܟ ܠܗ ܡܣܬܘܟܐ . ܘܐܝܟ ܢܗܘܪܐ ܒܝܕ ܐܢܫܝܐ ܐܝܠܝܗ ܡܬܩܪܐ ܒܢܘܗܪܐ (Photo period) ، ܘܦܪܢܣܐ ܕܫܡܫܡܘܬܐ .

ܘܫܘܐܠܗ ܠܒܝܬ ܐܠܦܐ (Garner Allard) ܕܡܬܩܪܐ ܒܢܘܗܪܐ ، ܚܕܟܡܐ ܒܫܢܐ ܝܗܒܘ ܠܠܦܐ ܥܠ ܕܝܢܘܬܐ ܦܪܢܣܘܬܢܝܬܐ ܠܢܟܝܬܐ . ܘܡܢ ܗܘܟܢܐ ܐܝܟ ܕܡܢ ܫܢܠܛܠܗܘ ، ܫܘܪܝܐ ܒܡܠܘܐܐ ܕܡܬܝܕܥܢܘܬܐ ܒܢܘܗܪܐ (Photo periodism) ܠܡܬܚܙܝܢܐ ܠܐܢܫܘܬܐ ܒܕܟܝܬܐ ܕܝܘܡܐ (Short day) ܒܝܕܥܬܐ ܕܡܬܥܠܝܐ ، ܡܢܗܝܗ ܕܢܟܝܬܐ ܠܫܕܐ ܐܢܠܝܬܐ ܫܚܝܢܬܐ . ܟܕ ܠܫܡܫܗ ܠܡܕܥܢܘܬܐ ، ܫܕܐ ܝܕܥܬܐ ܫܒܝܫܬܐ .

ܐܢܝܐ ܠܫܬܐ ܕܢܟܝܬܐ ܠܝܘܡܐ ܕܝܘܡܐ ܕܡܬܚܙܝܐ ܒܢܘܗܪܐ ، ܗܘ ܒܘܕܠܗ ܒܢܫܝܐ ܕܝܘܡܐ ܐܪܝܟܐ . ܐܢܝܐ ܒܫܡܗܘ ܡܢܝܢܬܐ ܐܠܗ ܡܢܬܐ ܠܢܫܝܐ ܕܝܘܡܐ ܐܪܝܟܐ ، ܒܡܬܚܙܝܐ ܕܝܘܡܐ ܟܪܝܐ ، ܒܡܝܢܐ ܐܢܫܐ ܡܢ ܬܪܬܝ ، ܘܟܕ ܡܦܠܣܐ ܕܡܢܘܪܘܬܐ ܐܘܡܢܬܐ . ܘܠܗ ܟܠܒܗ ܐܝܬܘܬܐ ، ܡܟܝܢ ܬܪܝܢ ܕܬܫܥܐ ܠܝܘܡܐ ܕܝܘܡܐ ، ܡܟܝܢ ܬܪܝܢ ܕܬܫܥܐ ܠܝܘܡܐ ܕܝܘܡܐ ، ܘܟܕ ܡܬܕܟܪܗ ܠܦܐܪ̈ܐ ، ܟܕ ܦܠܚܐ ܡܬܘܪܟܬܐ ܡܕܪܫܘܬܐ ܕܟܝܢܐ ܠܡܬܩܪܐ ܒܢܘܗܪܐ ܒܝܕ ܛܪܦܐ . ܘܠܐܢܝܗ ܛܪܦܐ ܡܝܛܐ ܟܠܗܝܢ ܐܝܟ ܗܪܟܐ ܕܠܡܬܕܥܢܘܬܐ ܢܣܝܐ ܡܢ ܛܪܦܐ ܡܝܛܐ ܗܪܟܐ .

ܘܩܢܝܢ ܡܫܘܠܛܐ ܢܨܒܬܐ ܠܫܘܡ ܡܟܪܝܘܬܐ ܕܐܪܥܘܬܐ ܕܡܫܡܫܢܐ
ܕܡܬܥܝܪܢܘܬܐ ܚܢܢܬܐ ܒܪܒܝܬܗ ܦܪܢܘܬܢܝܬܐ ܠܗ :

ܩܕܡܝܐ : ܢܨܒܬܐ ܕܝܘܡܐ ܟܪܝܐ : ܘܗܠܝܢ ܢܨܒܬܐ ܕܩܢܝܢ ܟܠܝܘܡ ܒܡܣܘܡܐ ܕܡܫܡܫܢܐ ܕܡܬܥܝܪܢܘܬܐ ܡܠܝܠܬܐ ܡܬܚܫܒܢܝܬܐ . ܐܝܟ ܥܠܝܢ ܘܟܪܬܐ ܕܡܝܘܬܐ ܘܕܘܕܝ ܘܥܪܒܝܗ .

ܬܪܝܢ : ܢܨܒܬܐ ܕܝܘܡܐ ܐܪܝܟܐ : ܘܗܠܝܢ ܢܨܒܬܐ ܐܝܢ ܕܩܢܝܢ ܟܠܝܘܡ ܒܡܣܘܡܐ ܕܡܫܡܫܢܐ ܕܡܬܥܝܪܢܘܬܐ ܐܪܝܟܬܐ ܐܝܟ ܚܛܝܐ ܫܥܪܐ ܘܣܘܪܦܐ ܘܦܘܓܠܐ ܘܣܠܩܐ ܘܟܪܘܬܐ ܕܦܪܕܬܐ ܘܥܪܒܝܗ .

ܬܠܬܐ : ܢܨܒܬܐ ܡܫܘܝܢܝܬܐ : ܘܗܠܝܢ ܢܨܒܬܐ ܕܩܢܝܢ ܟܠܝܘܡ ܒܣܕ ܠܝܠܘܬܐ ܦܪܝܫܐ ܡܢ ܐܘܪܟܐ ܕܝܘܡܐ . ܘܠܐ ܩܢܝܢ ܒܡܣܘܡܐ ܕܡܬܥܝܪܢܘܬܐ ܥܡ ܐܘܪܟܐ ܟܪܝܐ ، ܐܝܟ ܦܘܠܐ ܟܪܡܐ ܘܥܪܒܝܗ .

ܐܪܒܥܐ : ܢܨܒܬܐ ܠܐ ܡܫܘܝܢܝܬܐ : ܘܗܠܝܢ ܢܨܒܬܐ ܐܝܢ ܕܩܢܝܢ ܒܠܝܠܘܬܐ ܒܣܕ ܡܫܘܚܬܐ ܐܘܪܟܐ ܡܢ ܐܘܪܟܐ ܕܝܘܡܐ . ܡܛܠ ܒܗ ܡܫܘܚܐ ܕܡܬܥܝܪܢܘܬܐ ܒܟܪܝܘܬܐ ܡܬܚܫܒܢܝܬܐ . ܘܡܬܥܝܪܢܘܬܐ ܐܪܝܟܬܐ . ܐܘ ܐܦܫܪܬܐ ܘܡܢ ܛܘܦܣܗ . ܛܦܝܛܐ ܘܘܪܕܐ ܘܣܪܡܦܐ ܐܪܥܐ ܕܫܘܪܝܐ ܘܐܦܐ ܒܥܣܢܐ ܠܫܪܫܘܬܐ ܕܩܘܫܬܐ . ܘܠܐ ܕܘܘܐ ܡܪܐ ܚܢܘܬܐ ܗܘܪܡܘܢܝܬܐ . ܘܡܝܬܝܐ ܕܡܬܪܓܬܐ ܘܥܠܠܬܐ ܕܐܝܟ ܐܝܟ ܡܠܘܐܐ . ܫܪܝܪ ܒܦܘܪܬܐ ܕܪܒܝܘܬܐ ܒܘܪܣܬܐ ܘܦܪܚܐ ܕܡܥܡܥܘܬܐ . ܘܡܛܠ ܐܝܬ ܣܪܡܦܐ ܫܘܢܝܐ ܐܝܟ ܕܪܡܐ ܠܐܝܬܘܬܐ ܕܣܕ ܡܠܘܐܐ ܗܘܪܡܘܢܐ ܡܟܪܝܢܐ ܠܡܬܪܓܬܐ ܕܦܪܚܐ . ܦܬܠܘ ܡܫܝܢܐ ܡܬܡܘܘܬܗ ܒܗܘܪܡܘܢܐ ܕܦܪܚܐ ܐܘ **ܦܠܘܪܝܓܝܢ** (Florigen) .

ܘܦܬܠܘܗܝ ܒܓܒܪܐ ܟܢܛܠܐ ܘܣܘܦܛܐ ܪܒܐ ܠܦܠܛܬܐ ܕܡܠܘܐܐ ܕܦܠܘܪܝܓܝܢ ، ܐܝܬܐ ܠܐ ܡܘܬܒܐܠܗܘܢ ܗܠ ܐܪܟܐ . ܘܟܪܡܘܐ ܗܢܐ ܣܪܡܦܐ ܒܘܪܟܐ ܘܦܪܝܥܬܐ ܕܢܨܒܬܐ ܡܦܪܝ ܣܪܡܦܐ ܡܠܘܐܐ ܐܝܟ ܕܟܠܝ ܕܪܡܘܟܐ ܕܦܘܠܣܐ ܕܐܘܟܣܝܓܝܢ ܒܡܟܟܪܝܘܬܗ . ܘܦܬܐ ܗܢܐ ܡܪܝܐ ، ܕܪܡܘܟܝܐ ܕܐܘܟܣܝܓܝܢ) ، ܐܝܟ ܕܡܛܐܠܝ ܣܕ ܟܪܐ ܒܫܪܫܘܬܐ ܕܩܘܫܬܐ ، ܟܕ

ܡܬܚܫܚܢܘܬܐ ܕܦܘܠܚܢܘܬܐ ܕܦܩܣܐ ܒܟܪܟܐ ܠܗܘܢܐ ܒܝܢ ܐܦܩܝܢ
ܘܪܗܘܒܝܢܗ ܠܗ ܢܝܫܐ.

ܘܡܛܠ ܗܪܗܘܢܐ ܕܡܬܪܥܝܢ ܚܕ ܛܪܐ ܒܦܘܠܚܢܘܬܐ ܕܦܩܣܐ. ܘܐܦ
ܦܝܪܘܗܝ ܡܗܘܢܕܐ ܠܢܝܫܐ ܐܝܟ ܕܫܩܠ ܠܚܕ ܢܘܗܪܐ ܐܪܥܢܐ ܠܦܩܣܐ
ܐܝܟ ܘܪܕܐ ܡܢ ܛܘܦܣܐ. ܐܝܟ ܒܪ ܦܩܣܐ ܒܚܕ ܢܘܗܪܐ ܒܪܝܫܐ. ܐܦ ܦܝܪܘܗܝ
ܣܘܓܐܐ ܪܥܡܬܐ ܕܗܘܪܡܘܢ. ܕܡܬܪܥܝܢ ܒܚܕܡܬܐ ܢܝܫܐ. ܐܝܟ ܕܫܩܠܝܢ
ܢܐ ܠܢܘܗܪܐ ܐܪܥܢܐ ܠܦܩܣܐ (ܐܝܟ ܥܩܪܐ ܛܪܦܐ). ܐܝܬܐ ܒܡܫܚܠܦܘܬܐ
ܠܗܘܢܐ ܕܪܟܢܐ ܕܡܬܢܝܚܘܬܐ ܥܠ ܦܘܠܚܢܘܬܐ ܕܦܩܣܐ. ܡܛܠ ܕܠܐܢܝܢ
ܒܐܝܠܢܘܬܐ ܕܢܝܫܐ ܗܪܢܝܢܐ ܒܝܢܐ (ܐܝܟ ܕܡܬܡܠܝܢ ܠܗܘܪܡܐ
ܕܣܘܓܐܐ ܒܗܪܝ ܒܘܣܡܐ ܕܪܒܝܬܐ) ܐܝܟ ܠܘܪܐ ܘܠܦܬܐ ܘܣܘܪܦܐ
ܘܦܛܠܐ ܘܥܪܒܘܗ. ܘܡܬܪܓܝ ܐܝܬ ܢܝܫܐ ܥܪܥܐ ܘܥܡܐ ܘܛܪܦܐ ܒܘܪܝܐ
ܡܪܡܝܐ. ܒܗ ܡܬܪܓܝ ܗܢܚܐ ܒܘܪܝܐ ܗܪܢܝܐ. ܒܗܪ ܕܡܠܐܟ ܠܡܪܝܪܘܬܐ
ܕܗܪܘܐ. ܗܢܐ ܗܘ. ܐܝܬ ܢܝܫܐ ܗܫܐ ܠܪܪܠܐ ܡܬܢܝܚܘܬܢܐ ܒܗܦܐ.
ܠܛܘܪܠܐ ܕܦܩܣܐ ܠܗܝܡ.

٣ — ٢ — ٤ — ܡܬܚܫܚܢܘܬܐ ܕܠܐܦܘܩܣܝܢ ܒܒܗܪܬܐ ܕܛܪܦܐ :

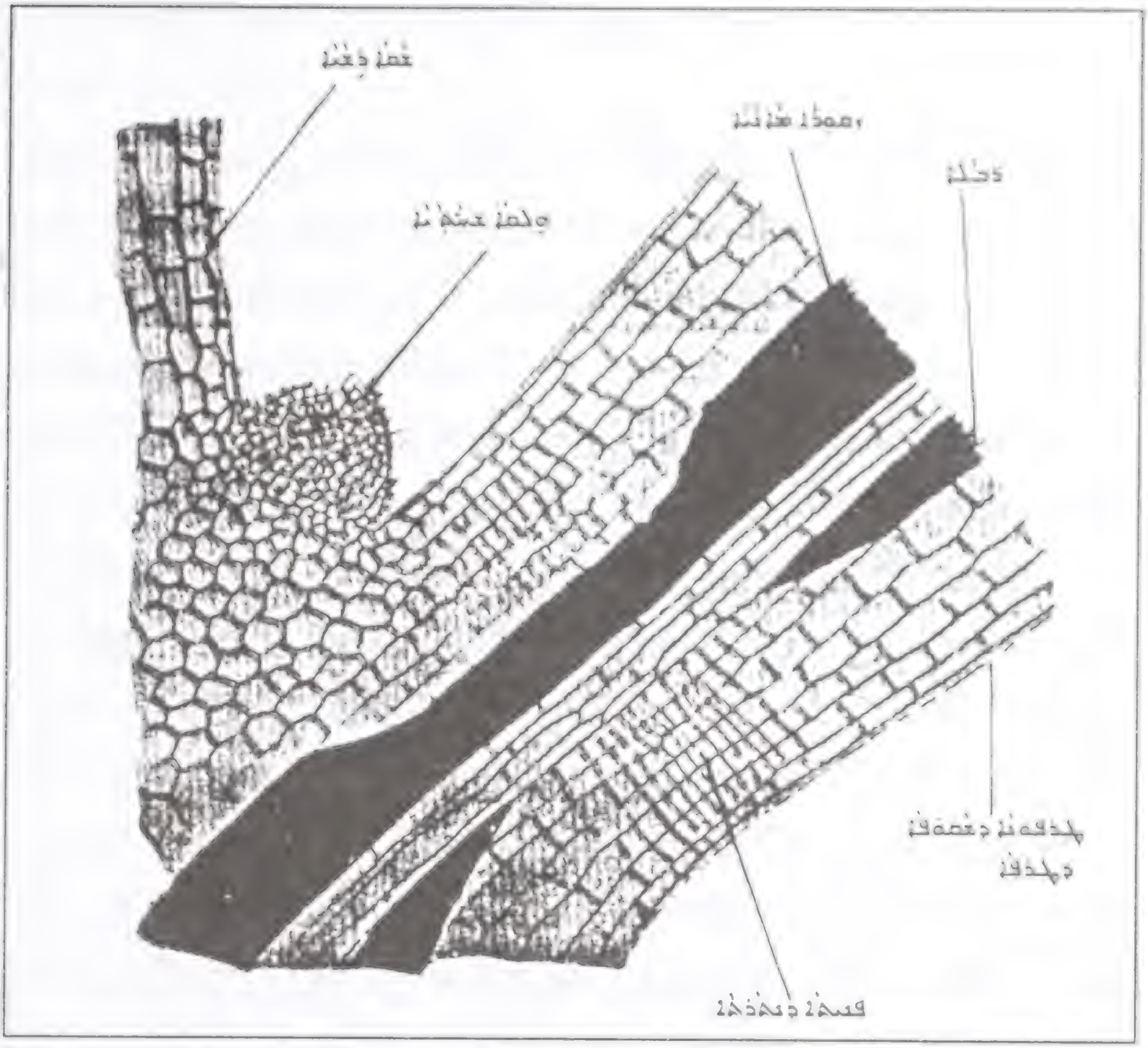
ܡܬܝܢܐ ܕܢܗܪܬܐ ܕܛܪܦܐ ܝܠܗ ܚܕܐ ܡܬܝܢܐ ܦܣܘܠܗܝܢܬܐ
ܦܪܝܟܐ ܘܡܘܪܗܢܝܬܐ. ܘܗܝ ܒܪܢܐ ܪܒܐ ܠܗܘܐ ܒܚܕܪܬܐ ܕܥܘܣܠܦܐ
ܕܪܒܝܬܐ. ܗܢܐ ܘܡܢ ܒܗܥܪܝܬܐ. ܒܚܠܝܗ ܢܝܫܐ ܝܦܝܬܐ. ܘܝܠܗ
ܢܝܫܐ ܕܦܝܫܐ ܡܡܥܣܢܝܬܐ. ܐܝܬܐ ܠܗ ܢܝܫܐ ܕܦܝܫܐ ܛܪܘܦܝܬܝܬܐ.
ܘܝܠܗ ܢܝܫܐ ܐܡܝܢܝܬܐ ܝܪܘܡܘܬܐ. ܘܐܦ ܛܪܦܗ ܒܢܗܪܝ. ܐܝܬܐ ܥܠ
ܐܪܝܟܘܬܐ ܕܝܢܬܐ. ܘܦܬܚ ܡܗܘܣܠܦܐ ܒܛܪܦܐ ܚܕܬܐ. ܘܣܘܥܪܢܬܐ
ܝܠܗ ܢܗܪܬܐ ܕܛܪܦܐ ܐܣܟܡܐ ܡܢ ܐܣܟܡܐ ܕܫܟܘܬܐ. ܘܢܗܪܬܐ ܕܛܪܦܐ
ܝܠܗ ܦܘܠܚܢܘܬܐ ܡܬܛܪܕܬܐ. ܘܠܐ ܝܠܗ ܥܠܣܘܪ ܐܝܬܝܘܬܐ ܕܫܘܬܐ ܐܘ
ܒܘܠܒܠܐ ܒܪܗܘܢܐ ܕܛܪܦܐ. ܐܝܬܐ ܢܗܪܬܐ ܕܛܪܦܐ ܗܘܝܐ ܦܠܛܐ
ܕܦܘܠܚܢܘܬܐ ܢܝܫܝܬܐ ܒܗܘܪܬܢܐ ܕܛܪܦܐ (Leaf abscission). ܘܦܬܪ

ܛܪ̈ܦܐ ܒܙܒܢܐ ܕܣܬܘܐ ܒܬܫܪ̈ܝ. ܗܢܐ ܟܕ ܠܝܬ ܐܝܟܐ ܕܫܩܝܐ (ܩܘܪܐ) ܕܛܪ̈ܦܐ.

ܘܡܕܡ ܠܢܦܠܬܐ ܕܛܪ̈ܦܐ ܡܬܬܙܝܥܐ ܡܢ ܕܒܝܢܬܐ ܠܗ̇ ܒܫܟܒܬܐ ܕܦܘܪܫܢܐ (Abscission Layer). ܘܗ̣ܝ ܠܗ̇ ܚܕܐ ܫܟܒܬܐ ܡܬܘܙܝܥܬܐ ܡܢ ܣܓܝ ܗܒܒܐ. ܐܘ ܡܢ ܡܝܬܬܐ ܕܗܒܒܐ ܡܢ ܣܘܟܐ ܡܬܚܬܝ ܠܣܘܓܐܐ ܕܩܝܡܐ ܡܢ ܡܠܘܐܐ ܕܗܘܦܟܝܢ ܘܡܬܒܥܝܢ (ܨܘܪܬܐ ٧ ـ ٤).

ܘܦܘܪܫܢܐ ܗܢܐ ܡܢ ܦܠܚܘ̈ܬܐ ܕܥܒ̈ܕܐ ܕܠܘܒ̈ܟܐ ܕܡܘܒ̈ܠܐ ܕܦܣܝܩܬܐ ܕܦܘܪܫܢܐ ܘܢܦܠܝܢ ܛܪ̈ܦܐ ܒܢܦܠܬܗ ܟܕ ܕܡܝܟ ܢܘܠܐ ܕܛܪ̈ܦܐ ܒܡܫܒܬܐ ܕܪ̈ܘܚܐ. ܡܢ ܦܠܚܘ̈ܬܐ ܕܡܢܥܬܐ ܐܘ ܟܠܝܬܐ ܕܡܬܬܙܝܥܬܐ ܕܐܘܟܣܝܢ ܠܗܘܢ. ܐܝܟܐ ܡܙܝܢܬܐ ܠܗ ܡܬܪܒܝܢܘܬܐ ܒܫܘܦܢܐ ܕܛܪ̈ܦܐ ܥܠܝܡ̈ܐ. ܐܝܟܢ ܕܩܝܣ̈ܐ ܡܛܥ̈ܢܐ ܢܘܦܠܗܘܢ. ܘܦܣܩܬܗ ܣܘܝܬܐ ܒܥܒ̈ܕܐ ܕܡܛܥܢܘܬܐ ܕܗܘܡܢܐ ܕܢܘܦܠܐ ܡܢ ܛܪ̈ܦܐ. ܫܘܦܢܐ ܢܟܝܠ ܢܘܦܠܐ. ܢܗܪ ܒܗܪ ܣܓܝ ܡܬܪܫܐ. ܐܦ ܟܕ ܗܘܐ ܛܪ̈ܦܐ ܥܠܝ̈ܡܐ. ܐܝܟܢ ܒܥܒ̈ܕܐ ܕܡܬܡܠܝܬܐ ܕܫܘܦܢܐ ܕܛܪ̈ܦܐ ܢܟܝܠ ܢܘܦܠܐ ܒܐܘܟܣܝܢ (IAA). ܗܝ ܡܥܒܕܢܐ ܠܚܘܕܝܗ̇ ܕܦܘܪܫܢܐ ܕܫܘܦܢܐ ܕܛܪ̈ܦܐ. ܒܦܪܡܝܚ ܡܢ ܐܝܟܐ ܢܣܒܐ، ܕܐܘܟܣܝܢ ܡܬܘܒܪܐ ܠܗ ܢܘܦܠܐ ܕܛܪ̈ܦܐ ܥܠܝܡ̈ܐ. ܡܛܠ ܡܢ ܠܗ ܫܘܦܢܐ. ܘܡܥܠܐ ܠܢܦܠܬܐ ܕܐܝܟ ܛܪ̈ܦܐ. ܗܢܐ ܟܕ ܡܥܠܐ ܠܡܘܠܕܐ ܕܠܘܒܟܐ ܡܘܪܟܒܐ ܠܦܣܝܩܬܐ ܕܦܘܪܫܢܐ. ܘܒܥܒ̈ܕܐ ܕܡܛܥܢܘܬܐ ܕܢܘܦܠܐ ܕܐܝܟ ܛܪ̈ܦܐ. ܡܬܬܡܢܥܐ ܕܐܘܟܣܝܢ ܠܐ ܦܝܫ ܐܝܬܘܗܝ. ܘܡܬܝܕܥܐ ܠܦܣܩܬܐ ܕܦܘܪܫܢܐ.

ܘܦܣܩܬܗ ܒܡܬܝܕܥܢܘܬܐ ܡܬܪܓܫܢܘܬܐ ܕܐܘܟܣܝܢ. ܠܡܘܬܐ ܕܢܦܠܬܐ ܕܛܪ̈ܦܐ ܘܐܦ ܦܐܪ̈ܐ ܟܕ ܒܫܠܡܘ. ܐܝܟ ܕܡܬܥܗܕܢܘܬܐ ܒܡܦܠܣܘܬܐ ܕܪܟܝܟܘܬܐ. ܕܐܢܫܝ̈ܐ ܒܐܘܟܣܝܢ ܦܪܝܫܬܐ ܐܝܟܢ ܕܣܓܝ ܘܡܬܦܪܫܝܢ. ܟܕ ܢܗܘܐ ܦܐܪܐ ܕܐܝܬ ܒܗ ܐܘܟܐ ܡܢ ܢܒܝܥܬܐ ܡܕܡ ܡܬܝܕܥܢ. ܘܡܛܠ ܕܐܘ ܪ̈ܫܘܡܘܗܝ ܒܐܘܟܣܝܢ ܡܬܘܣܦܐ ܠܢܦܠܬܗܘܢ.



ܨܘܪܬܐ (٧ ـ ٤) ܡܫܚܠܦܘܬܐ ܕܥܡܘܕܐ ܕܫܪܫܐ
ܡܢܘܕܐ ܠܦܝܬܐ ܕܦܪܘܣܐ

٢ ـ ٣ ـ ܡܫܬܘܕܥܘܬܐ ܗܘܝܐܢܝܬܐ ܡܢ ܫܪܫܐ ܐܘܣܦܝܐ ܠܓܪܡܢܐ ܢܘܒܠܢܝܐ .

ܐܡܝܢ ܒܫܒܒܐ ܠܓܪܡܐ ܢܘܒܠܢܝܐ ܘܡܫܬܒܫܘܬܗ ܥܠ ܐܪܥܐ ܡܢ ܡܫܬܢܝܬܐ ܦܣܘܠܛܢܝܐ ܠܗ ܢܒܬܐ . ܘܠܐܫܢܐ ܒܐܪܡܝܐ ܠܗܘܐ ܐܣܪܝܬܐ ܠܣܪܐ ܕܒܠܬܐ ܐܢܫܬܐ ܠܓܪܡܐ ܢܒܬܝܐ . ܘܒܠܗ ܠܐ ܡܬܕܒܠܢܘܬܗ ܒܢܒܬܐ ܦܪܝܫܬܐ . ܘܡܫܝܢܬܐ ܠܗ ܠܟܠ ܓܪܡܢܐ ܐ· ܗܘܐ ܒܢܝܢܐ (ܦܝܪ ܡܬܒܪܐ ܡܢ ܠܗ ܢܒܬܐ) . ܐܘ ܡܬܒܪܐ ܒܝܬ ܢܘܫܢܝܗ . ܕܡܫܒܪܐ ܡܫܬܒܫܘܬܐ ܡܕܡܢܝܬܐ ܒܪܢܐ ܡܢ ܐܘܪܚܐ ܕܠܢܫܐ ܕܠܐ ܦܘܪܢܝܐ . ܘܦܝܬܠܗ ܦܪܝܫܬܐ ܡܦܠܚܬܐ ܕܐܦܫܝܢܐ ܡܬܒܪܐ ܒܘܪܟܬܐ ܘܫܠܡܘܬܐ ܕܒܘܫܬܢܝܬܐ ܒܣܘܪܬܐ ܠܚܘܪܬܐ . ܘܡܢ

ܡܬܝܒܠܐ ܠܗܘܢ ܡܢܗ ܐܢܫܘܬܐ ܕܐܝܠܢ̈ܐ ܒܕܪ̈ܓܐ ܗܕ̈ܢܐ ܒܗܕ ܡܦܠܚܬܐ ܕܡܫܩܝܢܘܬܐ ܘܕܘܒܠܢܘܬܐ (ܙܒܠܐ) .

ܘܡܢ ܐܝܟ ܡܫܟܚܘܬܐ ܗܘܟܢܝܬܐ ܒܝܬ ܐܢܫܘ̈ܬܐ ܠܗܘܪܡܘܢ̈ܐ ܢܘܫܡܝ̈ܐ ܐܝܟ ܗ̈ܠܝܢ :

١ ـ ܐܘܪܒܝܬܐ ܘܡܬܬܪܨܬܐ ܕܝܥܪ̈ܐ :

ܗܘܪܡܘܢ̈ܐ ܡܕܡܕܝܢ ܠܒܘܪܐ ܕܐܘܪܒܝ ܒܝܘܣܦ̈ܐ ܕܡܬܬܪܨܬܐ ܕܝܥܪ̈ܐ ܥܠ ܡܠܦܐ ܥܡܝܐ . ܘܦܝܠܘ ܢܗܝܬܐ ܕܢܫܦܐ ܥܡܠܐ ܡܢ ܦܐܪܬܐ ܕܓܘܥܠܐ ܘܓܪܦܐ ܢܘܚܡ̈ܝܐ . ܘܡܢ ܢܕܘܡܐ ܦܓܘܪ̈ܢܝܬܐ . ܢܝܚܝܢ ܡܠܘ̈ܐ ܐܘܪܒܝܐ ܡܥܢܒ ܠܡܬܬܪܨܬܐ ܕܝܥܪ̈ܐ . ܘܦܝܠܘܗܝ ܡܘܦܠܚܐ ܐܝܟ ܢܦܝܫܐ ܒܢ̈ܝܐ ܥܡ ܐܢܕܪܐ ܡܢ ܐܘܪܒܝܐ ܡܬܘܕܝܐ ܒܝܬ ܢܘܩܢܝܬ (ܐܝܟ ܐܝܕܘܠ ܢܥܘܕܐ ܕܒܕܘܒܢܘܢ ܘܐܝܕܘܠ ܢܥܘܕܐ ܕܦܕܘܦܢ ܘܢܦܬܠܢ ܢܥܘܕܐ ܕܐܫܝܬܝܕ ܘܥܕܡܘܗ) ܒܝܬ ܕܪ̈ܓܐ ܕܡܬܬܪܨܬܐ ܕܝܥܪ̈ܐ ܥܠ ܠܝܒܠܐ ܕܘܝܫܐ ܠܗ ܡܘܕܝܢܝܬܐ ܐܝܟ ܕܗܘܢܐ ܡܬܬܪܨܬܐ ܕܝܥܪ̈ܐ ܠܗܘܢ ܢܝܫܬܐ ܢܝ ܡܠܘܝܬܐ ܠܗ ܢܫܝܩܘܬܐ ܚܢܝܢܝܬܐ .

٢ ـ ܡܬܬܪܨܬܐ ܕܦܐܪ̈ܐ ܝܚܝܕܝܐ (ܦܐܪ̈ܐ ܕܦܐܪ̈ܐ ܕܠܐ ܒܙܪ̈ܘܥܐ) :

ܢܕܝܕܐ ܡܠܘ ܕܗܘܪܡܘܢܬܐ ܕܓܘܥܠܐ ܡܥܪ̈ܒܐ ܠܒܘܝܢܐ ܕܡܥܢ̈ܝܐ ܒܕܘܬܐ ܕܐܕܥܐ ܕܢܚܝܬܐ . ܘܐܦ ܗܘܪܡܘܢܬܐ ܕܫܘܬܠܐ ܘܡܬܬܪܨܬܐ ܕܒܙܪ̈ܘܥܐ ܗܘܢܐ ܐܫܝܬܐ ܠܕܒܝܬܐ ܕܦܐܪ̈ܐ . ܘܡܘܕܝܠܘܗܝ ܒܘܨܝܐ ܘܕܢܝܬܐ ܕܡܥܒܕܢܘܬܐ ܕܓܘܥܠܐ ܘܫܘܬܠܐ ܒܕܒܝܬܐ ܕܦܐܪ̈ܐ ܗܘܢܐ ܒܐܘܪ̈ܚܐ ܕܦܠܛܗܘܢ ܠܡܠܘ̈ܐ ܡܥܪ̈ܒܐ ܠܕܒܝܬܐ ܕܦܐܪ̈ܐ . ܘܥܕܡ ܗܘ ܗܘܐ ܐܝܟ ܦܐܪ̈ܐ ܕܪܒܝ ܕܠܐ ܠܒܥܬܐ ܕܗܘܪܡܘܢܬܐ ܕܫܘܬܠܐ ܡܕܝܥܬܐ . ܘܐܦ ܐܕܥܐ ܡܢ ܪܒܝܬܐ ܕܦܐܪ̈ܐ ܡܬܘܡܕܐ ܡܠܘ ܒܕܒܝܬܐ ܢܚܝܕܬܐ (Parthenocarpy) ، ܘܦܐܪ̈ܐ ܝܕܥܐ ܡܬܘܡܕܐ ܡܢܐ ܒܦܐܪ̈ܐ ܢܚܝܕܐ Parthenocaric Fruits ، ܘܗܘ ܦܪܝܫܬܐ ܡܠܘ ܒܕܒܝܬܐ ܒܝܕܥܬܐ ܢܚܝܬܐ ܐܝܟ ܢܕܘܡܐ ܘܢܝܐ ܕܢܚܘܡܐ ܘܥܝܢܐ ܘܡܕܘܢ ܘܐܢ̈ܫܐ ܘܥܕܡܘܗ . ܘܡܘܕܝܠܘ ܕܢܚܘܡ̈ܐ ܐܘܪܒܝ̈ܐ ܠܡܥܒܕܢܐ ܕܐܝܬ ܢܚܝܬܐ ܗܘ ܐܝܠܢ̈ܐ ܡܘܥܝ̈ܐ ܠܢܚܝܬܐ ܐܝܟ

ܕܗ̇ܢܘܢ ܠܓܪ̈ܣܬܐ ܕܨܘܒܝܢܐ. ܘܡܘܬܒܠܗ̇. ܒܥܕ̈ܬܐ ܕܡܫܡ̈ܫܢܐ ܐܝܟ
ܕܐܝܬܠܗ̇. ܡܛܝܒܐ ܠܐ ܗܠܘܐ̈ ܥܡܠܐ ܡܢ ܦܪ̈ܝܫܐ ܕܨܘܒܝܢܐ ܘܐܒܘ̈ܗܬܐ
ܨܘܒܝܢܐ. ܐܝܟ ܫܒܝܒ ܥܠ ܐܘܪܚܝܬܐ. ܒܦܪܢܣ ܡܢ ܐܝܟ ܕܐܘܪܚܝܢ
ܡܨܠܐ ܥܠܐ ܐܝܢܐ ܒܪܝܬܐ ܕܦܢܝܬܐ ܢܨܝܒܝܢ. ܘܡܫܡܫܢܘܬܐ ܕܨܘܒܝܢܐ
ܘܫܘܬܠܐ ܡܛܪܢܐ ܡܕܪܫܬܐ ܕܐܘܪܚܝܢ ܗܘ ܕܡܨܥܝܐ ܠܒܪܝܬܐ ܘܡܨܥܬܐ
ܕܦܢܝܬܐ. ܘܢܗܘܘܢ ܕܐܝܬܠܗ̇. ܡܛܝܒܐ ܡܢ ܫܢܬܐ ܕ ١٩٣٦ ܡܘܬܒܠܗ̇.
ܠܡܦܢܝܢܘܬܐ ܕܒܪܝܬܐ ܕܦܢܝܬܐ ܢܨܝܒܝܢ. ܒܝܕ̈ܝܐ ܕܡܫܡܠܝܬܐ ܕܫܡܥܐ
ܕܥܒܕܐ ܒܡܠܘܐܐ ܕܐܢܘܢ ܫܒܝܒܐ ܥܠ ܐܘܪܚܝܢ. ܘܦܪܢܣܗ ܡܦܠܚܬܐ
ܕܐܘܐ ܐܘܪܚܐ ܒܡܕܪܫܬܐ ܕܦܢܝܬܐ ܗܦܝܟܐ ܡܢ ܒܪܘܪܒܐ. ܘܡܢ ܨܘܦܐ
ܕܢܥܝܬܐ ܐܝܟ ܕܡܦܢܝܬܐ ܗܠܘ ܥܪܝܬܐ ܕܒܪܝܬܐ ܕܦܢܝܬܐ ܢܨܝܒܝܢ.
ܒܡܦܢܝܘܬܐ ܕܐܘܪܚܝܢ ܨܘܫܝܐ ܘܦܠܦܠܐ ܘܡܘܕܥܐ ܘܡܐܢܐ.
٣ - ܡܦܪܢܣܘܬܐ ܕܥܘܬܪܐ :
ܡܘܬܒܠܗ̇ ܡܕܝܢܬܝܐ ܠܐܣܝܘܬܐ ܕܝܕܥܬܐ ܕܥܘܕܪܢܐ ܒܫܘܫܠܐ ܒܫܘܫܡܘܬܐ
ܕܦܫܝܬܐ. ܘܐܦ ܡܘܬܒܠܗ̇ ܠܡܒܒܪܢܘܬܐ ܕܝܕܥܬܐ ܕܥܘܕܪܢܐ ܒܥܘܕܢܐ
ܒܡܕܪܫܬܐ ܕܐܘܪܚܝܢ. ܘܥܠ ܕܐܘܐ ܝܕܥܬܐ ܕܥܘܕܪܢܐ ܐܝܟ ܠܗ
ܐܢܫܘܬܐ ܐܢܘܫܘܬܐ ܠܓܘܕܐ. ܟܕ ܡܦܢܝܬܐ ܗܠܘ ܒܥܠܡܝܬܐ
ܒܢܘܨܐ ܕܢܘܡܘܣܐ ܥܒܝܕܬܐ ܕܢܥܝܬܐ ܐܝܟ ܕܦܫܝܛ ܒܝܕ̈ܝܐ ܡܬܚܠܦܐ.
ܕܦܫܝܛ ܒܣܪܐ ܝܕܥܐ. ܘܥܒܕ ܗܘܝ ܡܦܝܣܐ ܠܡܓܡܪܬܐ ܕܟܢܘܫܬܐ ܒܝܢ
ܐܪܥܐ. ܐܝܟ ܕܠܐ ܗܠܘ ܟܢܘܫܬܐ ܥܢܝܢܝܗ ܡܦܢܝܢܐ (ܒܐܡܝܢܘܬܐ ܕܗܘܠܝܐ)
. ܐܦ ܡܦܝܣܐ ܠܫܘܫܠܐ ܕܡܘܟܟܐ ܕܥܠܠܬܐ ܒܣܪܐ ܠܗܘ.
ܐܝܬ ܠܗ ܥܢܝܢܐ ܐܝܟ ܕܗ̇ܢܘܢ ܠܓܪ̈ܣܐ ܫܡܫܡܘܬܝܢܐ ܒܗܦܟܐ (ܗܕܐ
ܡܕܝܢܬܐ) ܡܛܠ ܕܦܫܝܛ. ܐܝܟ ܕܥܢܝܢܐ ܗܠܝܢ ܥܢܝܐ. ܡܦܢܝܬܐ ܗܠܘ
ܡܫܡܠܝܐ ܒܫܘܫܡܐ ܘܐܘܪܚܝܢܐ (ܘܦܪܢܣܝܢ ܓܒܪܢܝܐ) ܠܗܘ ܣܠܩܐ
ܕܓܪ̈ܣܐ ܕܫܡܫܡܘܬܐ ܒܗܦܟܐ. ܘܡܥܒܕܢܘܬܐ ܕܦܫܝܛ ܠܗ ܫܢܬܐ ܒܢܬܗ.
٤ - ܘܥܕܬܐ ܕܦܪܢܣܘܬܐ ܕܦܢܝܬܐ :
ܡܘܬܒܠܗ̇ ܡܕܝܢܬܝܐ ܕܐܝܟ ܡܦܢܝܬܐ ܗܠܘ ܠܗܘܒܝܐ ܕܡܕܪܫܬܐ ܕܦܢܝܬܐ
ܠܗ ܘܥܒܕܐ ܠܐ ܡܟܢܘܫܬܐ. ܘܥܒܕ ܡܫܡܠܝܐ ܒܐܘܪܚܝܢ. ܘܡܘܫܠܗ̇.

ܦܪ̈ܕܝܬܐ ܕܚܛ̈ܐ ܘܡܪܕܝܗ̇ ܡܢ ܢܟܝܬܐ ܐܗܐ ܡܒܢܝܬܐ ܒܡܘܒܕܬܐ ܕܦܪ̈ܕܝܘܬܐ ܕܦܐܪܐ . ܘܡܘܦܠܗ̇ ܐܗܐ ܐܘܪܚܐ ܒܡܥܝܢܘܬܐ ܕܡܛܦܪܬܐ ܕܦܐܪܐ ܒܫܢܬܐ ܝܕܝܥܬܐ . ܘܡܢ ܗܢ . ܦܐܪܐ ܦܠܝܛܐ ܡܢ ܡܢܛܠܬܐ ܒܐܘܪܚܐ . ܗܘܝ ܡܢܝ ܠܡܥܒܕ ܠܟܒܕܐ . ܐܦ ܐܘܪܚܐ ܡܢܠܝܐ ܐܘ ܡܡܘܫܚ ܠܬܪܒܝܬܗ

٥ . ܡܘܚܪܒܢܘܬܐ ܕܓܠܐ ܘܥܣܒܐ :

ܦܝܫܠܗ̇ ܡܘܦܠܚܐ ܐܘܪܚܝ̈ܐ ܡܚܪ̈ܒܢܐ ܢܘܟܪ̈ܝܐ ܠܓܠܐ ܒܥܘܡܩܐ ܕܡܚܪ̈ܒܢܐ ܠܓܒܝܢ̈ܐ ܟܐܪ ܕܦܝܫܠܗ̇ ܒܢܝܬܐ ܠܓܘܕܪܢܗ ܫܘܦܬܐ . ܐܝܟ ܕܟܐܙܝ ܡܘܦܠܚܐ ܒܡܥܒܘܕܬܐ ܝܠܕܬܐ . ܘܡܢ ܐܢܝ ܐܘܪܚܝ̈ܐ ܒܝܕ ܐܢܫܐ ܕܦܝܫܠܗ̇ ܡܘܦܠܚܐ ܠܐܗܐ ܒܝܬܐ ܡܢܝܢ ܟܠܗܘܢ ܦܢܘܟܝ̈ܐ ܫܡܘܙܐ ܕܐܫܟܝܪ (MCPA) ، ܘܕܝ ܟܠܗ ܕܦܝܢܘܟܝ̈ܐ ܫܡܘܙܐ ܕܐܫܟܝܪ (٢,٤ D) . ܘܡܘܒܝܠܗ ܠܓܘܕܪܢܐ ܕܒܢܝ ܡܠܐܐ ܥܠ ܢܟܝܬܐ ܡܢܕܝ ܟܕܝ ܦܠܛܐ ܦܪܢܝ ܓܕܦܐ . ܐܝܟ ܕܡܫܟܚܝ ܠܐܪܥܐ ܕܓܠܐ . ܐܢܝ ܠܐ ܟܟܒܝ ܒܢܫ ܢܟܝܬܐ ܡܢܕܝ ܚܕܐ ܦܠܛܐ ܐܝܟ ܣܓܝ ܘܫܪܪܐ ܘܒܘܫܢܐ ܘܦܢܝܐ ܕܟܒܕܐ ܘܡܪܕܝܗ . ܘܦܘܪܫܐ ܒܡܥܢܝܢܬܐ ܠܐܘܪܚܐ ܒܝܢ ܢܟܝܬܐ ܕܣܓܐ ܦܠܛܐ ܘܟܕܝ ܦܠܛܐ ܒܠܥܐ ܥܕܐ ܠܦܘܪܫܐ ܕܒܘܫܠܗ ܫܢܐ ܒܝܢ ܐܢܐ ܟܕܝ ܒܘܢܝܐ ܡܢ ܢܟܝܬܐ . ܠܐܠ ܡܢ ܗܘ . ܟܡܐ ܐܝܟ ܟܡܘܠܐ ܐܢܫܐ ܡܢܘܟܦ ܒܢܝܐ ܦܘܪܫܐ . ܘܥܠܗ ܒܡܫܘܚܬܐ ܕܠܡܝܐ ܕܐܘܪܚܝܐ ܠܗ ܓܕܦܐ . ܘܡܫܘܚܬܐ ܕܐܘܪܚܝܢ ܗܝ ܕܝܗܒܐ ܘܦܬܐ ܥܠ ܓܕܦܐ ܐܕܝܐ ܘܫܒܩܐ ܐܝܟ ܕܝܠܗ ܐܢܫܘܬܗ ܒܘܝܕܐ ܣܕܝܩܬܐ ܥܠ ܟܡܐ (ܢܟܝܬܐ ܡܢܕܝ ܚܕܐ ܦܠܛܐ) . ܒܝܕ ܡܢ ܡܐ ܕܝܠܗ ܐܢܫܘܬܐ ܒܓܕܦܐ ܦܗܝܐ ܒܘܫ ܐܢܫܘܬܐ (ܢܟܝܬܐ ܡܢܕܝ ܟܕܝ ܦܠܛܐ) . ܐܦ ܢܟܝܬܐ ܦܪܝܫܐ ܢܝܫܐ ܒܪܓܡܐ ܒܘܫܟܢܗ ܠܐܘܪܚܝܐ .

ܘܡܘܗܪܐ ܕܟܪܐ ܡܢ ܡܦܠܚܬܐ ܕܒܢܝ ܡܘܚܪܒܢܐ ܒܘܪܟܬܐ ܟܪܐ ܟܪܐ ܠܗ ܘܥܣܒܐ ܟܟܒܝ ܒܙܘܪܬܐ ܡܛܠܬܐ ܥܠ ܒܫܘܬܐ ܕܥܠܠܬܐ . ܘܐܕܝܘܬܗ . ܘܠܗ ܣܕܝܩܐ ܦܝܫܐ ܕܥܠܠܐ ܡܘܚܪܒܠܗ ܡܦܠܚܬܐ ܕܐܘܪܚܝ̈ܐ ܐܝܟ ܡܘܚܪܒܢܐ ، ܘܐܢܝ ܕܦܪ̈ܕܝܬܐ ܕܥܠܠܬܐ ܕܣܓܝܐ ܠܢܒܝܥ ܡܢ ܫܒܥ ܡܠܝܘܢ̈ܐ ، ܘܠ ٧٥٪ ܒܥܠܠܬܐ ܕܙܘܙܐ .

٦ - ܡܦܫܬܐ :

ܒܕܝܠܗܐ ܐܠܘ ܕܡܢܘܢܝܬܐ ܐܠܘ ܡܦܫܬܐ ܕܡܕܝܛܘܦܐ ܚܕܟܡܐ ܢܕܚܝܢ ܕܟܠܐ ܥܘܫܬܐ ܕܝܘܠܦܢܗ ܐ. ܦܪܝ ܡܢܠܝܗ ܢܡܩܘܬܐ ܣܥܝܫܬܐ ܠܥܘܫܬܐ ܐܘ ܠܐ ܦܪܝ. ܘܦܪܕܐ ܡܩܝܘܬܐ ܕܝܘܠܦܢܐ ܠܐܝܬܘܬܐ ܕܡܥܝܘܬܐ ܝܠܠܬܐ ܡܢ ܐܘܪܚܝܢ ܗܘ ܕܡܒܠܐ ܠܥܘܫܢܗ. ܐܝܟܐ ܒܟܢܫܬܐ ܕܝܕܢܐ ܚܝܘܬܐ ܡܥܝܘܬܐ ܕܐܘܪܚܝܢ ܠܘܬܗ، ܘܡܦܪܕܐ ܥܘܫܬܐ ܕܝܘܠܦܢܗ.

ܘܥܘܫܠܘܗܝ، ܘܕܘܟܐ ܐܝܟ ܐܘܐ ܡܬܚܬܐ ܘܡܥܝܘܪܐܠܘܗܝ، ܒܡܬܡܠܬܐ ܕܡܛܪܐ ܕܡܕܝܛܘܦܐ ܒܐܘܪܚܝܢ ܡܬܚܠܦܐ ܠܡܬܢܝܬܐ ܕܡܫܢܐ ܕܡܦܫܬܗ.

٣ - ܛܘܟܣܐ ܗܘܪܡܘܢܝܐ ܠܗ ܚܝܘܬܐ

٣ — ١ - ܗܘܪܡܘܢܐ ܘܥܒܪܢܝܬܐ ܛܡܝܪܬܐ :

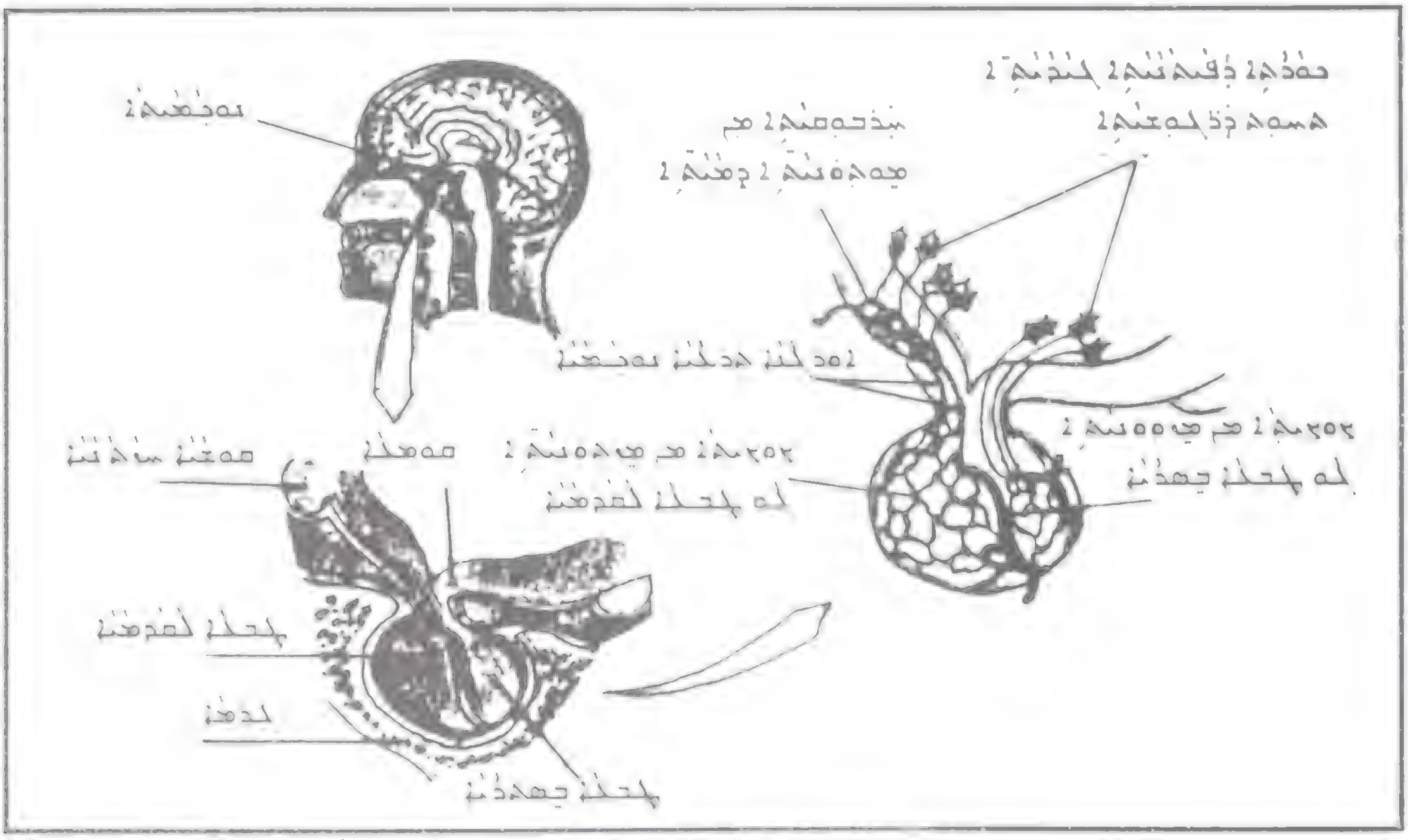
ܦܬܝ ܡܪܘܦܐ ܗܘܪܡܘܢܐ ܒܝܕ ܥܒܪܢܝܬܐ ܒܕܝܠܗܐ ܕܥܒܪܢܝܬܐ ܛܡܝܪܬܐ (Endo crine glands) ، ܘܡܛܠ ܐܝܟ ܡܛܘܠܡܐ ܡܢܐ ܠܕܘܟܝܐ . ܘܡܦܠܛܝܢ ܠܐܪܦܬܗ ܠܗ ܐܘܪܚܐ ܕܣܘܪܕܐ ܡܣܪܢܝܬܐ . ܘܡܢ ܥܒܪܢܝܬܐ ܛܡܝܪܬܐ ܥܒܪܬܐ ܝܬܝܪܬܐ (Pitui tary gland) ، ܗܝ ܕܐܝܬ ܒܟܘܡܐ ܕܡܘܚܐ ، ܘܥܒܪܬܐ ܬܪܘܝܬܐ (Thyroid gland) ، ܘܥܒܪܢܝܬܐ ܕܟܠܝܬܐ ܕܬܪܘܝܬܐ (Parathy rpid glands) ، ܘܬܪܬܝܢ ܥܒܪܢܝܬܐ ܕܥܠ ܟܘܠܝܬܐ (Adrénal glands) ، ܘܐܝܬ ܐܚܪܢܝܬܐ ܥܒܪܢܝܬܐ ܛܡܝܪܬܐ ܠܡܬܒܪܐܝܬ . ܐܦ ܡܢ ܦܝܪܢܝܬܗ (Pancreas) ܘܥܒܪܢܝܬܐ ܕܟܘܠܝܬܐ (Gonads) ، ܘܥܒܪܬܐ ܡܥܝܛܝܬܐ ܕܐܣܛܘܡܟܐ (Gastite mucesa) ܘܡܥܝܬܐ ܕܐܢܟܝܐ (Duodenal mucosa) ، ܘܐܝܬ ܗܪܡܢܐ ܡܢܗܝܢ ܒܬܪܦܬܐ ܕܗܘܪܡܘܢܐ ܒܟܠܗܘܢ ܕܡܢܗܘܢ ܒܝܢܬܐ ܐܚܪܢܝܬܐ . ܘܥܒܪܢܝܬܐ ܛܡܝܪܬܐ ܠܐ ܦܪܝ ܕܐܝܬ ܡܢ ܚܕܐ ܥܒܪܬܐ ܒܘܠܬܐ . ܘܐܠܐ ܦܬܝ ܡܣܘܪܝܦܐ ܡܢ ܗܠܝܢ ܥܒܪܬܐ ܘܐܝܬ ܐܣܦܝܢܐ ܠܠܝܐ (ܐܠܘܦܪܝܢ) ، ܘܐܣܦܝܢܐ ܡܝܠܢܐ (ܡܝܘܦܪܝܢ) ، ܘܐܣܦܝܢܐ ܠܘܢܐ (ܐܝܕܘܦܪܝܢ) ܐܣܦܝܢܐ (٧ — ٥) .

ܐܝܟܐ ܗܘܪܡܘܢܐ ܐܝܟ ܐܝܬ ܡܠܘܐܐ ܗܪܡܢܐ ܠܐ ܡܬܚܝܒ ܠܗܘܢ ܡܢ ܐܪܥܐ ܕܡܠܘܐܐ ܗܪܡܢܐ ܪܒܐ ܒܚܝܘܬܗ . ܘܟܠܗܐ ܗܘܝ ܚܕܟܡܐ ܡܢܗܘܢ ܦܘܪܫܢܐ ܐܘ ܐܣܪܢܐ . ܘܐܟܝ ܦܬܝ ܡܪܘܦܐ ܠܐܪܦܬܐ ܕܪܡܐ ܒܟܡܝܘܬܐ ܚܝܘܪܬܐ

ܕܫܪܝܢ ܚܒܘܫ ܗܘܐ ܕܡܬܠܝ ܠܘܩܘܒܠܐ. ܐܘ ܗܘܪܡܘܢܐ ܡܘܒܥܢܐ ܐܚܪܢܐ. ܘܐܝܟ ܦܬܚܝ ܗܠܝܢ ܐܡܝܢܐܝܬ. ܕܠܐ ܐܝܬ ܫܘܝܫ ܠܗ ܕܡܐ. ܐܝܟܢܐ ܗܘܪܡܘܢܐ ܡܘܒܥܢܐ ܟܠܗܘܢ ܗܘܐ ܦܒܪܬܐ ܠܥܠܝܬܐ ܐܚܪܬܐ. ܐܘ ܦܒܪܬܐ ܕܒܦܠܓܗ ܒܪܡܬܐ. ܐܘ ܟܠ ܚܘܪܐ ܐܚܪܢܐ. ܦܬܐ ܡܥܘܠܝܬܐ ܥܠ ܫܘܪܝ ܕܚܕ ܗܘܪܡܘܢܐ ܒܚܕܐ ܐܘܪܚܐ ܡܕܝܢܬܐ ܥܠܝܡܘܬܐ ܕܡܬܪܗܛܢܘܬܐ ܡܬܕܪܢܝܬܐ. ܟܕ ܡܬܝܕܥ ܗܘܪܡܘܢܐ ܒܢܝܗ ܠܥܘܡܗ ܥܠܘ ܕܡܐ. ܘܠܡܬܝܕܪܬܐ ܕܐܗܘܐ، ܒܡܬܚܫ ܐܗܘܐ ܠܘܩܒܐ:

ܡܪܝܐ ܦܒܪܬܐ ܢܘܟܡܝܬܐ ܚܕ ܡܢܝܢܐ ܡܢ ܗܘܪܡܘܢܐ. ܐܝܟ ܕܦܠܚ ܥܠ ܦܒܪܬܐ ܠܥܠܝܬܐ ܐܚܪܢܝܬܐ ܐܝܟ ܦܒܪܬܐ ܢܘܬܠܝܬܐ ܘܥܠ ܟܘܠܝܬܐ ܘܡܢ ܐܝܟ ܗܘܪܡܘܢܐ. ܗܘܪܡܘܢܐ ܡܬܪܕܝܢܐ ܠܪܡܝܬܐ (TSH) (Thyroid stimulating hormone) . ܗܘ ܕܡܬܪܕܐ ܠܦܪܝܫܘܬܐ ܕܦܒܪܬܐ ܪܡܝܬܐ ܘܪܒܝܬܗ. ܘܗܕܐ ܡܬܚܡܢܐ ܪܡܝܬܐ ܠܗܘܪܡܘܢܐ ܡܬܪܕܝܢܐ ܠܪܡܝܬܐ ܒܪܡܬܐ ܕܪܒܝܬܗ ܡܢ ܐܬܪܘܬܐ ܠܕܡܐ.

ܦܫܘܛ ܪܫܘܬܝܬܐ (Hypothal mus) ܘܗܘ ܝܠܗ ܚܕ ܦܘܪܫܐ ܡܢ ܡܘܡܚܐ ܕܡܬܚܝܠܐ ܥܡ ܦܒܪܬܐ ܢܘܟܡܝܬܐ. ܒܐܘܪܚܐ ܕܡܬܐ ܦܬܚܬܐ ܒܕܝܢܬܐ ܒܗܘܪܡܘܢܐ ܦܬܚܢܐ ܢܘܟܡܝܐ (Hypophysioportal system)، ܘܡܡܘܪܬܐ



ܐܨܘܪܬܐ (٥ — ٧) ܦܒܪܬܐ ܢܘܟܡܝܬܐ

ܕܠܒܢܝܬܐ ܡܫܘܡܗܐ ܒܗܕܐ ܠܥܘܒܕܐ ܕܦܥܠܢܝܬܐ . ܢܦܠܚ ܠܡܫܡܫܘ ܒܗܣܘܗ ܕܓܠܘܬܢܝܬܐ ، ܘܫܪܝܬܐ ܕܗܪܡܘܢ ܒܬܘܟܠܢܝܬܐ ܐܗܦܟܬܐ (٧ ـ ٥) ، ܡܪܦܝܐ ܗܣܘܗ ܕܓܠܘܬܢܝܬܐ ܚܕ ܡܢܝܢܐ ܡܢ ܠܡܘܦܠܐ ܚܠܪܐ (Releasing factor) ܡܬܘܪܒ ܠܗܢܕܬܐ ܒܬܟܠܢܝܬܐ ܠܪܦܝܬܐ ܕܗܘܪܡܘܢܗ ܘܡܢ ܐܢܐ ܠܡܘܦܠܐ . ܠܡܘܦܠܐ ܕܪܕܐ ܪܦܝܬܐ ܕ TSH ܘܦܝܫ ܪܡܝܙܐ ܐܝܟ TRF .

ܘܐܢܢ ܕܪܝܫ ܒܘܢܐ ܕܗܢܕܘܟܣ ܠܗ ܕܡܐ . ܡܟܝܠ ܐܝܟܘ ܗܣܘܗ ܕܓܠܘܬܢܝܬܐ . ܒܡܟܠܝܬܐ ܕܪܦܝܬܗ ܡܢ (TRF) ، ܘܗܕܟܐ ܟܠܝܐ ܪܦܝܬܐ ܕ TSH . ܒܗ ܪ ܗܕܝ ܒܝܬ ܒܘܢܐ ܕܗܢܕܘܟܣ ܠܗ ܕܡܐ . ܘܡܟܪܝܐ ܕܘܪܬܐ ܚܕܬܐܝܬ . ܐܝܟ ܕܡܘܒܝܢܬܐ ܠܗ ܠܗ ܐܗܐ ܡܫܪܓܐ :

٣ ـ ٢ ـ ܗܘܪܡܘܢܐ ܡܣܘܦܚܐ ܐܣܛܘܡܟܐ ܡܟܢܝܐ :

ܪܦܝܐ ܡܣܘܦܚܘܬܐ ܕܒܘܒܢܐ ܐܣܛܘܡܟܐ ܡܟܢܝܐ ܚܕ ܡܢܝܢܐ ܡܢ ܗܘܪܡܘܢܐ ܐܢܫܝܐ ܠܗ ܗܕܘܪܘܬܐ ܡܬܝܢܬܐ ܠܗ ܡܩܗܬܗ ܒܗܕܐ ܗܘܪܓܐ :

ܥܒܕܬܐ	ܗܘܡܐ ܡܪܦܝܢܐ	ܗܘܪܡܘܢܐ
ܡܥܝܪܐ ܠܡܪܕܘܬܐ ܕܪܦܝܬܐ ܕܚܡܘܨܐ ܕܗܝܕܪܘܟܠܘܪܝܢ ܘܦܦܣܝܢ ܘܡܫܪܓܐ ܠܙܘܥܐ ܕܐܣܛܘܡܟܐ	ܡܣܘܦܚܘܬܐ ܕܗܘܡܐ ܓܪܒܝܐ	ܓܐܣܛܪܝܢ (Gastrin)
ܡܟܠܝܐ ܠܙܘܥܐ ܕܐܣܛܘܡܟܐ ܘܪܦܝܬܗ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܢܐ ܘܡܥܝܐ	ܐܣܛܪܢ ܡܟܢܝܐ Entrogastrone
ܡܥܝܪ ܠܪܕܐ ܪܦܝܬܐ ܦܢܩܪܝܐܣܝܬܐ ܡܫܬܐ ܡܚܠܬܐ ܡܠܚ ܒܝܟܪܒܘܢܐ ܒܗܦܟ ܡܢ ܐܣܝܕܐ ، ܘܡܥܝܢܘܬܐ ܝܬܝܪܬܐ ܡܢ ܒܝܪܩܘܢܐ ܡܥܝܪ ܠܪܦܝܬܐ ܕܡܪܪܬܐ ܒܝܬ ܟܒܕܐ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܢܐ	ܣܝܩܪܝܢ Secretin
ܡܥܝܪ ܠܦܢܩܪܝܐܣ ܠܪܦܝܬܐ ܕܙܘܥܐ ܢܡܝܪܐ ܒܐܢܙܝܡܐ ، ܘܡܥܝܪ ܠܡܐܙܘܠܘܬܐ ܕܟܝܣܐ ܕܡܪܪܬܐ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܢܐ	ܦܢܩܪܝܘܙܝܡܝܢ Pancreozymin
ܡܥܠܝܐ ܥܠ ܪܦܝܬܐ ܡܥܝܢܝܐ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܐ ܙܥܘܪܐ	ܐܢܛܪܘܟܪܝܢܝܢ Entrocrinin
ܡܙܘܥ ܠܙܘܥܐ ܕܟܘܡܘܬܐ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܐ ܙܥܘܪܐ	ܡܘܫܠܢܐ ܕܟܘܡܘܬܐ Villokinin
ܡܥܝܪ ܠܪܦܝܬܐ ܕܒܪܘܢܝܬܐ ܕܒܪܘܢܐ	ܡܣܘܦܚܘܬܐ ܕܡܥܝܐ ܙܥܘܪܐ	ܕܘܩܪܝܢܝܢ Duocrini

ܫܘܐܠܐ ܕܦܘܫܩܐ ܥܣܝܪܝܐ (ܡܫܪܘܬܐ ܘܪܘܪܡܢܝܬܐ)

١ . ܡܢܝ ܗܝ ܕܟܐܡܬܐ ܗܢܐ :

ܘܪܘܪܡܢܐ ܝܘܠܦܢܝܐ . ܐܘܟܣܝܢܐ . ܡܬܚܫܒܢܘܬܐ ܝܘܠܦܢܝܬܐ . ܦܠܛܪܝܢ . ܦܝܬܐ ܕܦܪܘܓܪܡܐ ܒܗ ܛܪܦܐ D ٢.٤ . ܘܪܘܪܡܢܐ ܚܘܬܢܝܐ . ܕܐܦܪܘܝܢ . ܗܝܪܬܐ ܛܟܢܝܟܝܬܐ .

٢ . ܡܢܝܢ ܠܪܘܡܚܐ ܒܡܫܢܝܐ (ܚܣܝܠܬܐ ܡܬܚܬܝܬܐ) ܕܐܝܟܘܠ ܚܫܘܒܐ ܕܐܫܝܬܝ . ܘܠܡܢܐ ܒܘܢܝܐ ܡܢ ܘܪܘܪܡܢܐ ܡܢܒܝܬܐ ؟

٣ . ܡܚܝ ܠܒܘܢܝܐ ܪܫܝܐ ܕܘܪܘܪܡܢܐ ܝܘܠܦܢܝܐ ܒܝܕ ܡܢܝܢܬܐ ܕܡܬܒܪܝܢܘܬܐ ܒܝܢܝܬܐ ܠܟܠ ܚܕ ܡܢܗܘܢ .

٤ . ܡܢܐ ܐܝܬܘܗܝ ܪܫܐ ܕܐܝܟܘܠ ܚܫܘܒܐ ܕܐܫܝܬܝ . ܘܡܢܐ ܐܝܬܘܗܝ ܐܫܦܝܪܐ ܕܐܝܬܘܗܝ ܒܗ ܒܗ ܢܝܫܬܐ ؟

٥ . ܡܢܝܢ ܚܕ ܒܘܫܢܐ ܡܚܘܘܝܐ ܠܐܢܫܘܬܐ ܕܐܝܟܘܠ ܚܫܘܒܐ ܕܐܫܝܬܝ ܒܗ ܡܬܪܬܘܬܐ ܕܟܝܢܬܐ .

٦ . ܦܝܫ ܒܪܢܫܘܬܐ ܠܐܘܪܚܐ ܕܒܘܠܒܠܝ . ܘܚܒܝܒ ܠܦܝܫܬܐ ܕܟܐܪܐ ܕܐܘܟܣܝܢܐ ܒܗ ܟܝܢܬܐ ܒܘܪܟܬܐ .

٧ . ܡܢܝܢ ܠܟܐܪܐ ܕܐܘܟܣܝܢ ܒܪܝܐ ܕܟܐܡܬܐ ܗܢܐ :

ܐ . ܦܘܫܬܐ .

ܒ . ܡܬܪܨܬܐ ܕܦܐܪܐ ܢܛܝܪܐ .

ܓ . ܫܘܪܝܐ .

ܕ . ܢܬܪܬܐ ܕܛܪܦܐ .

٨ . ܡܚܝ ܒܪܢܫܘܬܐ ܠܡܬܪܬܘܬܐ ܦܪܘܛܝܢܝܬܐ ܠܘܪܘܪܡܢܐ ܝܘܠܦܢܝܐ

٩ . ܡܚܝ ܟܠܬܐ ܕܡܢܐ ܕܟܐܡܬܐ ܗܢܐ :

ܐ . ܘܪܘܪܡܢܐ ܝܘܠܦܢܝܐ ܐܝܬܠܗܘܢ ܐܢܫܘܬܐ ܒܝܕ ܢܝܫܬܐ ܒܫܘܫܬܐ ܠܢܝܫܬܐ ܡܢ ܘܪܘܪܡܢܐ ܚܘܬܢܝܐ ܒܫܘܫܬܐ ܠܚܝܘܬܐ .

ܒ . ܝܫܘܥܬܐ ܕܡܢܫܬܐ ܕܫܘܫܬܐ ܕܐܝܟܘܠ ܚܫܘܒܐ ܕܐܫܝܬܝ ܒܘܪܚܐ ܒܡܫܢܝܐ ܒܗ ܢܝܫܬܐ .

ܙ. ܚܫܝܫܘܬܐ ܕܡܫܝܚܝܘܬܐ ܕܡܬܚܫܒܐ ܒܪܘܪܝܐ ܒܪܝܐ ܐܝܬ ܠܗ ܒܗ. ܥܘܡܩܐ

ܚ. ܥܝܪܐ ܡܢܝܘܬܐ ܕܐܘܡܢܝܐ ܒܡܫܡܥܐ ܕܗܘܢܝܐ ܝܘܒܠܢܝܐ.

ܛ. ܗܘܝ ܡܠܦܢܐ ܣܓܝܐܐ ܥܠ ܡܫܝܚܐ ܦܪܘܩܐ ܒܠܫܢܐ ، ܘܗܠܝܢ ܒܗܝܢܐ ܒܝܬ ܡܘܬܒܐ ܒܡܫܝܚܝܘܬܐ ܕܘܪܫܬܗ ܡܢ ܐܣܝܪܐ.

١٠. ܡܫܝܚܐ ܠܗܘܪܡܘܙܐ ܘܡܫܝܚܐ ܡܫܝܚܐ ܗܝܡܢܬܐ ܕܦܪܩܗ.

١١. ܡܢ ܗܠܝܢ ܡܫܝܚܝܘܬܐ ܡܫܝܚܝܬܐ؟

ܪܫܘܡ ܚܕ ܡܫܪܝܬܐ ܡܢܗܘܪܐ ܠܐܪܡܝܘܬܐ ܕܡܫܝܚܝܘܬܐ ܕܝܘܢܐ ܕܗܘܪܡܘܙ ܕܗܝܡܢܘܬܐ ܪܡܝܬܐ ܠܗ ܕܡܢ.

١٢. ܪܫܘܡ ܚܕ ܦܘܪܩܢܐ ܒܗܘܪܡܘܙ ܕܒܘܟܪܐ ܦܬܓܡܐ ܘܡܢܘܬܗ ܕܦܢܝܐ ܘܦܘܠܚܢܗ.

ܠܒܪܝܬܐ :

ܙܡܝܪܐ ܡܫܠܛܝܢ ܥܠ ܟܠܗ ܗܕܪܘܬܐ ܝܘܢܝܬܐ ܕܡܢ ܕܦܪܣ ܠܗ ܠܗܘܡܐ ܕܦܪܢܬܐ ، ܘܗܝ ܒܡܦܩܢ ܠܗܪܡܘܙܬܐ ܕܦܪܣܐ ܕܗܘܪܡܙܬܐ ܡܦܪܣܬܐ ܡܢ ܦܘܡܐ ܘܗܠ ܡܫܡܪܬܐ ܕܦܪܣܐ ܘܠܡܝܬܐ ܕܪܘܡ ܡܢ ܕܒܝܬܐ ܡܢܐ :

١. ܐܪܐ ܕܗܘܪܡܘܙ ܡܦܪܫܐ ܠܗܘܪܡܙܐ.

٢. ܐܝ ܗܘܝ ܐܝܬ ܗܕܪܘܬܐ ܥܠܝܬܐ ܝܘܢܝܬܐ ܡܢ ܒܐܝܩ؟ ܪܫܘܡ ܠܗܝܟܐ ܕܐܠܗܐ ܘܡܬܗܪܡܙܗ ܥܠ ܐܪܥܐ.

ھەرێمی کوردستانی عیراق

وەزارەتی پەروەردە

ܩܠܝܡܐ ܕܟܘܪܕܣܬܢ - ܥܝܪܩ

ܘܙܝܪܘܬܐ ܕܡܪܕܘܬܐ



ܒܠܘܦܣܬܐ

ܗ̇ܢ̈ܝ ܣܬܣܬܐ ܒܠܦܬܐ

